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From the Springfield, Mass., Republican

Under the title of "The Railway Library 1909" are presented a number of papers and addresses of that year dealing with various phases of the transportation problem. The book is compiled and edited by Slason Thompson, manager of the bureau of railway news and statistics in Chicago. As much of the material so liberally supplied the public is hostile to the railroads, this presentation of their side of the story will be of special value to readers and students. Among the contributors may be mentioned J. Edgar Thomson, chief engineer of the Pennsylvania railroad company, James J. Hill, Senator John C. Spooner, etc.

Single copies of the 1909 issue of The Railway Library will be sent on application, accompanied by 15 cents in stamps to cover postage and expense of mailing.

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BUREAU OF RAILWAY NEWS AND STATISTICS
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THE RAILWAY LIBRARY

1910

[SECOND SERIES]

A COLLECTION OF NOTEWORTHY ADDRESSES AND PAPERS MOSTLY DELIVERED OR PUBLISHED DURING THE YEAR NAMED.

COMPILED AND EDITED BY

SLASON THOMPSON

DIRECTOR OF BUREAU OF RAILWAY NEWS
AND STATISTICS
CHICAGO

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CHICAGO
THE GUNTHORP-WARREN PRINTING CO.
1911

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INTRODUCTION

THE reception accorded to the initial volume of *The Railway Library for 1909* is the best warrant for the publication of its successor along the same lines. The object of the series, as it may now be safely called, is to preserve in more permanent and accessible form information of current interest regarding the railway problems liable to be lost in the exhaustless stream of newspaper, periodical and pamphlet publicity—in the headlines today, scattered in yesterday's wastebaskets tomorrow.

Following the precedent of 1909, the *Library of 1910* opens with a retrospect of American railways condensed from the sketch of the rise and progress of the Railways of the United States written by Mr. Henry V. Poor, for volume one of Poor's Manual for 1868-1869. Mr. Poor was then looking back over the first half of the history of railways on this continent. Looking forward, optimist though he was, his imagination did not quite comprehend the amazing development of the second period of two score years just ended.

Supplementing Mr. Poor's sketch, in a way, is a brief account of the 75th anniversary of the first railway in Germany. Singular to relate, this railway was never extended beyond its projected three and three-quarter miles from Nurnberg to Furth, and is still an independently operated railway.

With these for an historical background, the remaining papers of this issue seek to present the varied aspects of the railway situation in the United States today as reflected in the utterances of men closely identified with what they are writing or talking about.

Easily of first importance in the railway history of 1910 is the finding of ex-Judge Otis, special Master in Chancery in the Minnesota Rate Case, adopted and confirmed by Judge Sanborn in April, 1911. If sustained by the Supreme Court of the United States, the principles of this decision should go far to emancipating the railways from the multiplying vexations of rival regulation by Federal and State authority. It looks as if they might do for the railways what it took four years of civil war to do for the federal government—establish for them the necessary truth that the whole is greater than a part. When states are convinced that interference with railway rates and fares inevitably means interference with interstate commerce, the railways will begin to see daylight amid the labyrinths of state legislation calculated to contract their efficiency and usefulness as common carriers.

The question of efficiency in railway management is discussed from several angles by different writers—that from the employes' point of view voices a protest that no humane system can ignore or silence.

For the reason that it gives the latest data available for the railways of the United States, and also of the world, the annual report of the *Bureau of Railway News and Statistics* for the year ending June 30, 1910, is included in *The Railway Library.*

Acknowledgments are made to the writers and publishers of the various papers here presented for their courteous permission to reproduce them.

S. T.

Chicago, June 1, 1911.

RETROSPECT OF AMERICAN RAILWAYS IN 1868

By H. V. Poor.

CONDENSED FROM THE INTRODUCTION TO THE INITIAL VOLUME OF "POOR'S MANUAL OF THE RAILROADS OF THE UNITED STATES, 1868-9."

The highways of a people are one of the surest indices of their condition and character. Without them there can be neither commerce nor wealth; neither intelligence nor social order. The most striking displays of Roman greatness, and which long survived its fall, were its highways that, radiating from the Imperial City, conveyed the pulsations of its mighty heart to the remotest provinces, and were the instruments, not only to make known its will, but to enforce its prompt execution. No conquest was made that was not firmly united to it by the most perfect and most durable roads that could be constructed. Civilization and the best interests of humanity thus reaped an immense advantage from the military necessities of the Empire.

* * * * * *

The first substitutes for earth roads were canals. The cheapest of all transportation is by water, where the proper conditions exist. Considerable progress had been made in the construction of canals in England and upon the continent in the latter half of the eighteenth century. But the conditions under which such works can be constructed only sparingly exist, and where practicable they were often entirely inadequate to the requirements of commerce and of social intercourse. The charge for transportation, for example, on the canal between Liverpool and Manchester, as late as 1829, was from 8 to 10 cents per ton per mile, while the time required for the trip, 36 miles, averaged from two to four days. Such was the excess of freight offering that shipments, even at these rates, were delayed often for weeks. The inadequacy of these works and the oppressions of their managers, were felt to be intolerable, and attention was almost universally turned to devising some more competent, economical, and rapid mode of transportation. The mode finally adopted was the *railway.*

The perfect work of the present day has been the gradual development of the tramways used in the early part of the seventeenth century for carrying coal from the pit's mouth to the place of shipment. These were originally constructed of wood, but were afterward improved by covering the sleepers, or sills, with a flat iron rail. By such contrivances the effectiveness of the (horse) power employed was greatly increased. As soon as steam came into use its application as a *motive* power naturally suggested itself, and as early as 1815 stationary engines were employed in England for the movement of trains upon the existing railways. The first work of the kind, especially constructed for the purpose of using stationary power, was the Stockton and Darlington, which was opened in 1825. This enterprise succeeded as a freight, but not as a passenger line, from the slowness of its trains. Its success led to the construction of the Liverpool and Manchester railway. As this work approached completion, the question of the *kind* of motive power to be used naturally arose. Locomotive engines of a very rude structure had already been constructed, but it was still regarded as doubtful whether they could be made to supersede either horse or stationary steam power. To solve this question the Liverpool and Manchester Company offered a prize of $500 for a locomotive engine which should run at least 10 miles an hour, drawing *three* times its own weight. The trial took place on the 6th of October, 1829. Three locomotive engines competed for the prize, which was won by the Rocket, constructed by George Stephenson. This engine weighed 4 tons and 5 cwt. With 12 tons and 15 cwt. attached, the engine attained a speed of 29½ miles to the hour. The success was complete. This trial marks the modern Hegira, from which may be dated the great physical triumph of the race. It was the line of demarcation between the old and the new. In place of muscular power, the forces of nature, infinite in their extent, were henceforward to do the work of man —to be the beneficent instruments of his welfare, instead of being, as they had been, objects of apprehension and terror.

The *Rocket* possessed the essential features of the perfect machine of the present day. The Liverpool & Manchester Company at once decided in favor of locomotive power, and when their road was formally opened on the 15th of September, 1830, immense trains of passengers were drawn by locomotive engines at the rate of 15 miles to the hour.

The early settlements in the United States were, as a matter of necessity, made upon the seaboard. As the people moved inland, they followed, as far as possible, the line of navigable water-courses. But as these supplied such means only to a very limited area, the necessity of improved or artificial highways became paramount, not only as the instrument of commerce and travel, but as bands to hold together the different portions of our vast and widely separated domain. It was early seen that the vigorous Anglo-Saxon race would, in time, overrun the whole continent, but that it could be consolidated into a great empire only by providing the adequate means for commercial as well as social intercourse. The subject engaged the attention of General Washington at an early period of his life. He crossed the Allegheny range of mountains for the purpose of ascertaining whether a canal could be constructed from the navigable waters of the Chesapeake to the Ohio. Before the outbreak of the Revolutionary War, as a member of the House of Burgesses of Virginia, he urged the consideration of this subject upon that body. After the close of the war, and till his election as President of the United States, he was unremitting in his efforts to promote the construction of such works. He was president of the first company formed in Virginia to execute it. He also visited the State of New York, passed up the Mohawk to the summit from which the waters flow into the Hudson River on the one hand, and into Lake Ontario on the other, and where was to be realized, to its full extent, the work and the advantages which he so long and so earnestly sought to secure to his beloved state. He never, however, relaxed his efforts to carry out his plan of a canal across the Alleghenies. His ideas became traditional in Virginia. But if practicable under any circumstances, they ceased to be so after the railroad had demonstrated its superiority as a means of transport and intercommunication. To the outbreak of the Civil war that state still steadily persevered in her efforts to secure to herself, and to her magnificent harbors, the commerce of the interior. But nature had placed the great route of commerce to the north, and when it was opened, wealth, power, political and social influence moved from the Chesapeake to the Hudson.

The great mountain range which extends from the Gulf of St. Lawrence nearly to the Gulf of Mexico. and which presented such formidable obstacles to lines of canals across it in the State of Virginia, falls off in the State of New York into an immense plain, the summit of which is 145 feet *below* Lake Erie. Nature had too clearly indicated the great route of commerce for the country not to have it readily recognized as such. As early as 1724, the Surveyor General of the Colony of New York, Cadwallader Colden, suggested the improvement of the navigation of the Mohawk, and of the water-courses interlocking with this river and running into Lake Ontario. His suggestion was repeated at different times by the governors of the colony, without, however, leading to any action. Upon the close of the war of the Revolution the project was revived, and in 1792 *"The Western Inland Navigation Company"* was incorporated, for the purpose of making a lock navigation from the Hudson River to Lake Ontario. This company made such improvements as to allow the passage of boats of 15 tons burden from the Mohawk to Oneida Lake.

The limited capacity and imperfect construction of the improvements, however, rendered them almost wholly unremunerative. After expending nearly four times the original estimate, the company finally abandoned the work it had constructed.

After the failure of this attempt, little was done till 1810, when a commission was raised by the legislature of the state to examine the route of "the Western Navigation Company, with the improvements thereon." The committee made a report, recommending an appropriation of $5,000,000, for a canal, and that the enterprise be offered to the Federal Government. Such offer was, of course, rejected, and the War of 1812 soon following, all proceedings were suspended till the return of peace. The war, however had one good effect. It demonstrated, more than ever, the imperative necessity of the work proposed, and in 1816 a board of commissioners was appointed to consider the whole subject. This board reported at length to the legislature, which, on the 15th of April, 1817, passed an act authorizing the construction of a canal between the great Northern Lakes and the Atlantic Ocean. The requisite appropriations were made, and the work of construction was commenced on the 4th day of July of the same year, near Rome, and the union of the waters of the Great Lakes and the ocean was consummated and celebrated on the 4th of November, 1825—a day ever to be memorable in the history of this country.

Previous to the construction of the Erie canal, the cost of transporting a ton of merchandise or produce from the City of New York to the City of Buffalo was $100. The time required was 20 days. The cost and the time involved in this case was a striking illustration of the condition of the whole country; of the necessity of improved highways, and of the influence they have exerted in the creation of wealth, as well as their social and political importance. From the opening of the canal, the cost of transportation from Buffalo to New York was reduced from $100 to $5 per ton, and the time from 20 to 6 days. Previous to its construction, wheat grown in Central and Western New York was floated, in *arks,* down the Delaware and the Susquehanna Rivers to market—to Philadelphia and Baltimore. The city of New York—which now draws from districts 2,000 miles distant, by the routes used, its vast supplies of grain for distribution throughout all the eastern states, and for its foreign trade—was, a little over forty years ago, almost completely cut off from the trade of its own state. The cost of transporting wheat for 300 miles over ordinary highways will equal its average value at the point of consumption. Indian corn will bear transportation over earth roads only about 100 miles. With the improvements that have been made in the construction of highways, the great bulk of supplies of wheat and corn for the eastern markets are now grown in central Illinois and in the vast region lying to the west and northwest of Lake Michigan. As fast as our people have moved westward in their triumphal march across the continent, the railway which they have taken with them has given a high commercial value to whatever they produce, no matter how far distant from the points of consumption. Their progress, wealth, and we may say, civilization, have been the creation, within fifty years, of the inventive genius of the race.

The success of the Erie canal had an electric effect upon the whole country, and similar works were everywhere projected. The states of Pennsylvania, Maryland, Ohio, Indiana and Illinois at once embarked upon elaborate systems designed to give to every portion of their states the advantage of such works. Virginia, also, undertook the construction of a canal from the Chesapeake up the valley of the James River to the Ohio. We have not the space to give even a sketch of the progress and results of these undertakings. While very great advantages in many cases were secured, all the canals constructed in the United States, except the Erie, the Delaware and Raritan, and the Chesapeake and Delaware, may be regarded as commercial failures. They became so from the discovery of a better mode of transportation—the Railway. The State of Pennsylvania, alone, completed about 1,000 miles of canal within its territory, the whole of which have, within a few years, been disposed of at nominal prices to private companies. Their value had been almost entirely superseded by railways, which private enterprise soon constructed upon all their routes. Already the use of portions of these canals has been abandoned, while the earnings of others that are still kept up hardly meet the cost of their maintenance.

The people of this country were fully engrossed in the construction of canals at the very moment of the successful application, in England, of steam power to locomotion. With steam as a motive power, the advantages of railroads over canals, in being almost everywhere practicable, and capable of being operated at all seasons of the year, were readily appreciated, and numerous projects for their construction speedily followed. As in England, *tram* rails had previously been in use at Quincy, Massachusetts, for the purpose of transporting granite from the quarries to Neponset River; and at Mauch Chunk for the transportation of coal from the mines to the Lehigh Canal. The first RAILROAD undertaken was the *Baltimore and Ohio.* This road was chartered in 1827, and the work of construction commenced July 4, 1828. It was opened to the city limits in 1830; to Frederick, 62 miles, in 1831; and to Point of Rock's, 69 miles from Baltimore, in 1832. At this period its progress was, for a long time, arrested by a controversy with the Chesapeake and Ohio canal, in reference to the right of way.

Another of the pioneer roads was the *Mohawk and Hudson,* afterwards the Albany and Schenectady. This work was commenced in 1830, and opened in 1831. Both this and the Baltimore and Ohio were at first worked by *horse power,* except two inclined planes upon the former worked by stationary engines. Upon the Baltimore and Ohio Railroad a locomotive engine, probably the first constructed in this country, was first used in 1831. The first locomotive used on the Mohawk and Hudson, in 1831, was of English manufacture, weighing six tons. This was found, however, to be too heavy for the superstructure of the road, and a lighter one manufactured at the Cold Springs Works, in the State of New York, weighing three tons, took its place.

Another railroad, constructed at an early day, was the *South Carolina,* from Charleston to Hamburg, opposite Augusta, Georgia, a distance of 135 miles. It was opened in September, 1833, and at that time was the longest continuous line of railroad in the world.

Only a very moderate degree of success, either financial or commercial, attended the railroads first constructed in this country. They were rude and unsubstantial structures, involving a heavy outlay for repairs, and were very inadequate to the service even then required of them. Many of them were upon routes having little traffic, and were consequently almost entirely unremunerative. Time was required for the improvements which have given us the perfect works, and the perfect machine, of the present day, and for the development of a commerce and wealth now so vast and remunerative. Still, the construction of railways was steadily persisted in, and by the close of the year 1835 about 1,000 miles had been completed.

An extraordinary and most unhealthy stimulus was given to the construction of railroads and canals by the wild and extravagant spirit of speculation which swept over the country, commencing in 1834, and coming to a sudden end in 1837. A vast number of chimerical schemes were entered upon, and large sums expended or pledged for their construction. In addition to private undertakings, a large number of the states entered upon the construction of elaborate systems of internal improvements, nearly all of which, with the private enterprises, were suddenly overwhelmed in a common ruin. Not a tithe of what was undertaken was accomplished. For the want of means of communication the greater portion of the products of the interior still possessed very little commercial value. At that time only a very few of the mechanical contrivances existed which have since abridged labor to such an extent that the productive capacity of society, in proportion to its numbers, has been quadrupled in the last thirty years. The means for a speedy recuperation had not yet been created. Years, consequently, were required to repair the waste and loss that had been suffered. After resuming from the suspension of 1837, the great majority of the banks of the country again suspended payment in 1842. The period from 1837 to 1844 may be set down as one of the most gloomy and disastrous in the history of the country.

But even in this period considerable progress was made. The *Camden and Amboy Railroad,* connecting Philadelphia with New York harbor, was completed in 1837. In 1841, the line from Boston to Albany was opened. In December, 1842, the line from Albany to Lake Erie, at Buffalo, was fully opened, an event second in importance only to the opening of the Erie canal. Although restricted in the transportation of freight, for the benefit of the Erie canal, it at once became, in connection with the lake, the great route of travel between the eastern states and the interior. In 1842, the Philadelphia and Reading Railroad was opened to the coal fields of Pennsylvania, by means of which, and of lines subsequently constructed, adequate supplies of the great *source of power,* upon which are based the industries and commerce of the country, were for the first time secured.

The great movement in the construction of railways, however, and which has since suffered no considerable check, dates from the discovery of gold in California. The effect upon the industries and commerce of the country of the sudden addition of more than $50,000,000 annually to its circulating medium was prodigious. It had no precedent in history. The acquisition of California was equivalent to the acquisition of half a continent. A new field was opened, which absorbed no inconsiderable portion of the labor of the country at most remunerative rates. All sections were equally benefited. The wealth drawn so copiously from the western portion of the continent stimulated to an extraordinary degree the commerce, manufactures and trade of the eastern. For the increased wealth and newly-created enterprise of the nation, the railway offered the most attractive and appropriate field. Foreigners shared fully with ourselves in the enthusiasm which prevailed and proffered almost unlimited sums for the prosecution of our public works. From 1849 to 1857, 15,483 miles of railway were constructed. Then came a great commercial revulsion, which, commencing in the United States, swept round the world. But the nation had grown too strong to suffer anything more than a temporary check. The lines of railroad which had been constructed penetrated every important portion of the country, and gave a high commercial value to all its products.

* * * * * *

On the first day of January, 1849, a continuous line of railway was first formed between Boston and New York by the completion of the *New York and New Haven Railroad.* In the spring of 1851, the *Erie Railroad* was completed from the harbor of New York to Lake Erie—an event of first-rate importance in the commerce of the country. In the same year a continuous line of railway was opened between Boston and the St. Lawrence, by the completion of the *Vermont Central* and *Vermont and Canada Railroad*—the line from Ogdensburg to Lake Champlain having been opened in 1850. In the fall of 1851, the *Hudson River Railroad* was completed, giving to the city of New York a *second* line of railway to the great lakes; but some ten years after the city of Boston had secured such a connection.

In 1852, another important extension of the railway system of the country was made by the completion of the *Michigan Central* and *Michigan Southern Railroads,* from Lake Erie to Chicago. The lake served as a connecting link till 1853, when, by the opening of the *Cleveland and Toledo Railroad,* a continuous line of 1,000 miles of railway was formed between New York and Boston, and Chicago.

In the preceding sketch, we have traced the progress westward of the great trunk lines based upon Boston, New York, Philadelphia and Baltimore. Some progress, however, had been made as in the Valley of the Ohio, before either of these lines had reached that river or Lake Erie. The *Mad River Railroad,* now known as the Cincinnati, Dayton & Eastern, was commenced in 1835, and a portion of it completed in 1838. In 1848, in connection with the *Little Miami,* it formed the first continuous line of railway from Lake Erie to the Ohio River. The Little Miami was commenced in 1837, and completed to Springfield in 1846. The next important line constructed in Ohio was the *Cleveland, Columbus and Cincinnati,* which was commenced in 1848, and opened in 1851. The completion of this road formed the *second* line between the lake and the Ohio. The *Cleveland and Pittsburg,* the third line making the same connection, was opened in 1852. Of the lines running east and west in this state, the *Central Ohio* was opened from Wheeling to Columbus in 1854; the *Marietta and Cincinnati* in 1857; and the Pittsburg, Fort Wayne & Chicago in 1858.

In Indiana, the *Madison and Indianapolis,* one of the roads first constructed in the West, was opened in 1847. The first line running east and west through this state, and made up of the *Indiana Central* and the *Indianapolis and Terre Haute,* was opened in 1853. The next line having a similar direction was the *Ohio and Mississippi,* opened in 1857. The *New Albany and Salem,* now the *Louisville, New Albany and Chicago,* the first line connecting Lake Michigan and the Ohio and lying wholly in Indiana, was opened in 1854.

In Illinois, the first line undertaken was the *Sangamon and Morgan,* a portion of which was opened as a state work in 1839. This road now forms a part of the *Toledo, Wabash & Western.* The second line opened in Illinois was the *Galena and Chicago,* which was commenced in 1849, and opened for a distance of 10 miles in June, 1850. The railway first opened in this state from Lake Michigan to the Mississippi River was the *Chicago and Rock Island,* in February, 1854. This connection marked a very important extension of the railway system of the country. The second line to the Mississippi, made up of the *Galena and Chicago* and the *Illinois Central,* was opened early in 1855. The *Chicago and Alton* was opened in 1855; the *Chicago, Burlington & Quincy,* to the Mississippi River in 1856; the *Milwaukee and Prairie du Chien* in 1857; the *La Crosse and Milwaukee,* now a part of the *Milwaukee and St. Paul,* in 1858; and the *Western Union* in 1862. The *Chicago Branch* of the *Illinois Central* was opened from Chicago to Cairo in 1856.

The next important extension westward was the *Hannibal and St. Joseph,* which carried the railway system to the Missouri, in 1859. The next line between these rivers, made up of the *Chicago, Iowa and Nebraska* and the *Cedar Rapids and Missouri,* was completed in 1866. The western terminus of this road is the point of commencement of the *Union Pacific Railroad,* which has already ascended and crossed the summit of the Rocky Mountains, 560 miles west from the Missouri, 1,054 west from Chicago, and more than 2,000 west from New York.

Of the lines constructed through Central and Southern Illinois, the *Terre Haute and Alton* was opened in 1854, and the *Ohio and Mississippi* in 1857. From St. Louis westward, the *Pacific Railroad of Missouri* was completed in 1865, to a connection with the *Union Pacific Railroad, Eastern Division,* which now extends to the western boundary of the State of Kansas, a distance of nearly 400 miles from the western boundary of Missouri, and 700 west from St. Louis.

Another important extension, made in 1867, was the completion of the line from Milwaukee to St. Paul, Minnesota, a point distant nearly 1,500 miles from New York.

We have sketched the progress of railroads in what may be termed the Eastern and Western States, as they form, geographically and commercially, one system, of which the *Baltimore and Ohio Railroad* and its connecting lines form the southern boundary or member. South of Baltimore, there is no more important commercial city upon the Atlantic coast. The trade of all the interior, north of a line coincident with the lower Ohio, naturally seeks eastern outlets through the railways that have been opened. New Orleans still attracts to itself a large trade from the districts bordering the great river that flows past it, and its tributaries; but this trade has been and is being steadily drawn from it over railways to the great seats of consumption and of the foreign and domestic commerce of the country.

Several railroads were constructed, at an early day, in Virginia, the more important of which were those now forming the line traversing the state from north to south, and made up of the *Richmond, Fredericksburg and Potomac,* completed from Richmond to Fredericksburg in 1837, and to the Potomac in 1841; the *Richmond and Petersburg* opened in 1838; and the *Petersburg and Roanoke,* in 1843. The great line of Virginia, however, is the railway traversing the state diagonally from Alexandria to the boundary line of Tennessee, 382 miles, and made up of the *Orange and Alexandria* and the *Virginia and Tennessee Railroads.* The former of these roads was opened in 1859, and the latter in 1856. At the boundary it connects with the *East Tennessee and Virginia,* extending to Knoxville, Tennessee, and opened in 1858. From Knoxville this line is extended to Dalton, on the line of the Western and Atlantic Railroad, by the *East Tennessee and Georgia Railroad,* opened in 1856.

From Weldon, the Virginia system was extended to Wilmington, North Carolina, by the opening of the Wilmington and Weldon Railroad in 1840. It was not till 1853 that a connection was formed with the system of South Carolina by the opening of the *Wilmington and Manchester Railroad.* The *South Carolina Railroad,* as before remarked, was opened to Augusta, Georgia, in 1833. From Augusta, the *Georgia Railroad* was opened to Atlanta in 1839. The *Central Railroad* of that state was opened from Savannah to Macon in 1840. From Atlanta, the railway systems of South Carolina and Georgia were extended to the Tennessee River at Chattanooga, Tennessee, by the completion of the *Western and Atlantic Railroad of Georgia,* a state work, in 1850. From Atlanta a line of railway was opened to Montgomery, Alabama, in 1853, and from Montgomery to Mobile in 1862.

From Chattanooga to Nashville, the *Nashville and Chattanooga* was opened in 1854, and the *Memphis and Charleston* in 1857. The *Mobile and Ohio Railroad* was opened to Columbus, on the Mississippi River, near the mouth of the Ohio, in 1859. The line from New Orleans, made up of the *New Orleans, Jackson & Great Northern* and the *Mississippi Central,* was opened to a connection with the Mobile and Ohio at Jackson, Tennessee, the same year. The *Louisville and Nashville* was opened to a connection with the roads last named in 1861, and with Nashville in 1859.

Such is a brief sketch of the progress of the railways constructed upon the great routes of travel and commerce of the country. The total number of miles of railroad in the United States at the close of 1835 was 1,098; at the close of 1867, 39,244 miles. The actual increase for each year is shown in the following statement:

Year	Miles in Operation	Annual Increase Miles	Year	Miles in Operation	Annual Increase Miles	Year	Miles in Operation	Annual Increase Miles
1835	1,098	...	1846	4,930	297	1857	24,508	2,491
1836	1,273	175	1847	5,599	669	1858	26,968	2,460
1837	1,497	224	1848	5,996	397	1859	28,789	1,821
1838	1,913	416	1849	7,365	1,369	1860	30,635	1,846
1839	2,302	389	1850	9,021	1,656	1861	31,256	621
1840	2,818	516	1851	10,982	1,961	1862	32,120	864
1841	3,535	717	1852	12,908	1,926	1863	33,170	1,050
1842	4,026	491	1853	15,360	2,452	1864	33,908	738
1843	4,185	159	1854	16,720	1,360	1865	35,185	1,277
1844	4,377	192	1855	18,374	1,654	1866	37,017	1,832
1845	4,633	256	1856	22,017	3,643	1867	39,244	2,227

The least number of miles opened in any one year was 159 miles in 1843; the greatest, in 1856, when 3,643 were opened. In the first year of the war, the mileage constructed fell off to 621 miles.

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In 1840, the ratio of mileage of railroads to population was 1 mile of the former to 7,415 of the latter; in 1850, the ratio was 1 to 3,298; in 1860, 1 to 1,083; and in 1867, 1 to 905. The ratio of increase of population from 1860 to 1870 is estimated at 2 per cent annually, against 3.59 per cent for the previous decade. The decreased ratio has been mainly due to the Civil War, in which nearly 2,000,000 of men were engaged for four years. The ratio of 2 per cent will give a total population, in 1870, of 37,680,000. At that period there will probably be 45,000 miles of railroad in the United States, or 1 mile to 837 of population.

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The annual mileage of railroads is likely, for some time to come, to exceed in ratio the increase of population. From 1870, the increase of the latter may be estimated at 1,000,000 annually; while the number of miles of railroad constructed will probably equal 2,000 annually. These works are to be the common highways of our people; and while their increased mileage will not, in time, equal the absolute increase of population, the mileage in ratio to area will indefinitely increase. As in the past, their construction will be prompted more by consideration of the advantages to be derived from them in promoting the industries, and in facilitating the social intercourse of the people, than by any direct income they may yield. In no state has the limit of their construction been even approximately reached. In the State of Massachusetts, where the ratio of their mileage to area is 1 to 5.5, there are large districts still wanting these works. An equal ratio for the New England states would increase the mileage of that group to 12,000, in place of an existing one of 3,938. The greatest mileage to area in the Middle states is to be found in New Jersey, where the ratio is as 1 to 8.8. The same ratio would give to this group 15,640 in place of 9,552. The average mileage of these states will soon exceed that of New Jersey. In the West, the ratio for Ohio is 1 to 11.7—a rate which would give to the Western group 51,350 against 15,226. It may be assumed that in each of the groups named the largest ratio of mileage to area in any state will be reached by all at no distant day, or rather, when an equal density of population shall exist.

The states at present composing the Union have an area equal to 1,940,728 square miles. A railway mileage for the whole equal to the ratio of Ohio, or in the ratio of 1 to 11.7, would give an aggregate equal to 165,800 miles. A ratio equal to that found in Massachusetts would give 352,860 miles. The *territories,* which will speedily become states, have an area of about 1,300,000 square miles. The construction of railroads in several of these has already been commenced. They will soon become active theatres for the construction of these works. Although we have no right to expect that the newer states and territories will have a mileage equal to that now existing in some of the eastern states, we may assume one-half of the area of the whole country to be capable of sustaining a population that will justify the construction of one mile of railway to 20 square miles of territory. Such a ratio, which is certain to be reached with the progress of population, would give to the United States 165,000 miles of railway.

It is impossible to give a statement of the exact cost of the railroads of the United States from the incompleteness of the returns of a considerable number of companies, particularly in the Southern states. An estimate of $41,000 per mile, it is believed, will fully equal their average cost. That of the railroads of the New England states averages $40,500 per mile; that of the Middle states is somewhat greater, equalling about $53,000 to the mile. The cost of the railroads in the Southern states will not exceed $30,000 per mile. The cost of the roads of the western lines is about equal to the general average. The aggregate for the whole may be stated in round numbers at $1,600,000,000. Such cost is estimated, for the most part, at the amount of their *capital* accounts, which considerably exceed that of the money actually expended. It is not probable that the stocks and bonds issued by all the companies have produced more than 75 cents on the dollar. The capital accounts of many roads have been largely increased by issues made on the consolidation of lines, to equalize values; or from dividends paid in stocks or bonds, to represent estimated profits, or values over cost. Where such had been made, they have been usually balanced by adding an equal sum to the cost of the lines. On the other hand, net earnings, to a considerable extent, have been put into construction without any corresponding increase of nominal capital.

The means for the construction of our roads were originally supplied from sales of, or subscriptions to, their shares and bonds, in pretty nearly equal proportions. In reorganizations, which many of the roads have gone through, the tendency has been to convert debt, in whatever form, into capital. The large earnings that have been made have induced, in many cases, the conversion of debt into capital, a privilege which is generally conceded. The share capitals of the railroads of Massachusetts equal $52,699,028; their indebtedness of all kinds is $14,648,209. The share capital of all the New York roads the past year equalled about $96,000,000; their debts about $75,000,000. The ratio of share capital to debt of all the roads is about three to two. The tendencies referred to are still operating to increase the former and diminish the latter.

There is a similar difficulty in presenting a detailed statement of earnings. Still the amount for all the roads can be very accurately estimated. The railroads of the State of Massachusetts earned, the past year, $12,927 per mile; those of New York, $15,000; and those of Pennsylvania, $12,600 per mile. These states require full and accurate returns from their roads. The leading railroads in the West earn from $10,000 to $16,000 per mile. The Pittsburg, Fort Wayne and Chicago earned, the past year, $15,464 per mile; the Chicago, Burlington & Quincy, $15,218; the Cleveland, Painsville & Ashtabula, $19,247; the Michigan Central, $15,000; the Chicago and Northwestern, $10,000; and the Chicago and Alton, $14,000. It is therefore safe to estimate the earnings of the railroads of the Eastern, Middle, Western and Pacific states at $10,000 per mile, which, for the 29,146 miles in operation, will give a total of $291,460,000. The earnings of the railroads in the Southern states may be estimated at $5,000 per mile for 10,000 miles of road, or a total of $50,000,000. The aggregate for the whole country, consequently, will be about $340,000,000.

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The railroads of the United States sustain relations to the wants, and to the industries and commerce of our country far more intimate and important than those sustained by the roads of any other people. The markets for the products of nearly the whole of the United States are within a narrow belt of territory lying immediately upon the seaboard. The value of such products is in exact ratio to the facilities that exist for sending them forward. These facilities railroads have supplied to such an extent as to give a high commercial value to the corn grown in central Illinois, and to wheat in the extreme portions of Minnesota. Transportation by rail is rapidly superseding that by all other modes. Railroads have also supplied the perfect means of social intercourse between the most widely separated portions of our vast domain. As this is being occupied by successive waves of population flowing from the older states, a constant intercourse is kept up between those who remain behind and those who have gone forward to occupy the land. Railroads, therefore, are a first necessity. They can never be any less important or valuable in the future than they are today. On the contrary, we have only to look to the past to see how rapidly their usefulness and value must increase. No investment, therefore, can be safer or more productive than that in a well conducted railway, upon a good route. Every person in the nation, almost, must contribute to its support, while the very lives are bound up in it of those who reside within the sphere of its immediate influence.

The number of tons of freight carried upon the railroads of the country may be estimated at 2,000 tons per mile of road. The tonnage of the railroads of Massachusetts the past year equalled 3,812 tons to the mile; that of the railroads of New York, 3,100 tons to the mile; while those of Pennsylvania equalled 6,000 tons to the mile. The gross tonnage of 39,284 miles of roads, consequently, at the estimate, equalled 78,568,000 tons. If we deduct from this amount 15,000,000 tons for coal and other cheap material, and an equal amount for *duplications* of the same tonage on different roads, there will be left 48,488,000 tons of *merchandise* moved upon all the railways. At an estimated value of $150 per ton for this tonnage, the total value of the merchandise traffic of all the roads equals $7,273,200,000—a sum four and a half times greater than their aggregate cost, and twenty-two times greater than their gross income.

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The ratio of expenses to the gross earnings of our railroads equals, at the present time, fully 70 per cent. The cost of operating the railroads of Massachusetts the past year equalled 69.33 per cent. That of the railroads of the State of New York was fully up to 70 per cent. The cost of operating the railroads of the State of Pennsylvania was very nearly up to the ratio of New York. In this matter of *net* earnings there is an element of uncertainty which is regarded as peculiar to American railroads. But such uncertainty may be compatible both with integrity and capacity on the part of their managers. There must always be a pretty uniform ratio between the earnings of a railroad and its cost. As the former increases, so must the latter. A ratio of increase of earnings equal to 20 per cent annually, will require an increase in the construction account to an amount exceeding *net* earnings. In such case, therefore, unless the necessary means can be had from other sources than earnings, dividends will have to be foregone. The increase in construction account, rendered necessary by increase of traffic, would absorb for years the net earnings of some of our most productive lines. There is no reason why dividends should not be paid if earned. But so long as the construction account remains open there are great temptations and opportunities to charge to construction what should go to the working account. By such means an extravagant show of net earnings is sometimes made, which suddenly disappears when the *working* account can no longer borrow from construction. Here is one of the weakest points of the whole system, and one to which too close attention cannot be paid. It is, unfortunately, one to which very little attention is paid. So long as shareholders receive their dividends they will give themselves no concern as to the condition or management of their property.

At the rate estimated, the *net* earnings of all the railroads in the country the past year equalled, in round numbers, $100,000,000. The southern railroads, however, fall short of the average, owing to the reduced traffic and wretched condition of most of their lines. The estimated ratio, which was probably maintained in the northern states, would give for their railroads an aggregate of $87,000,000, or 6.7 per cent on their total cost. Large as this sum is, it is only an inconsiderable fruit of these enterprises. The incidental advantages resulting from them are five-fold greater than a fair interest on their cost. The losses that may be sustained on the construction of unproductive lines, or in the mismanagement of good ones, however disastrous they may prove to individuals, are vastly more than made up by the general increase in value of property due to their construction. The people of the United States could have well afforded to have constructed their railroads, even without the expectation of the direct return of a dollar from their cost.

The small percentage of *net* to the *gross* receipts of our railroads is in striking contrast with the results in other countries. It will be found, however, that the *net* return upon *cost* is greatly in favor of our own. In the northern states the gross earnings will equal just about 25 per cent annually of their cost. The southern railroads, before the war, showed a still more favorable result. The gross earnings of the railways of Great Britain for 1865 were $173,249,254, upon a cost of $2,199,596,306, a rate equalling 7.8 per cent. The expenses were $82,828,932, or about 49 per cent of the receipts. The net earnings were $90,419,322, a little more than 51 per cent. The miles run by all trains were 139,127,127. The earnings per mile, were $1.24. The earnings of the railroads of the United States equal about $2.25 to their train mileage. The gross earnings of the latter, in ratio to cost, are three times greater than those of the railways of Great Britain; their net earnings 2.6 per cent greater. In the United States the charges for transportation are much lower than in England. Low rates have to be adopted in this country to allow freight to be transported over great distances. In England the cost of a road is fully met at the outset. With us we are constantly constructing, using therefor a considerable portion of the net earnings.

There is no subject in which greater interest is felt by our people than in the economy of railway transportation. The internal commerce of the country, now so vast, has been the creation of railroads, which secure a market, at remunerative prices, for the products of every portion of our wide domain. The problem yet before them, and which must always continue so, and an unsolved one too, is the extent of reduction still possible to make in cost of transportation. At the rate of one and a half cents per ton, per mile, it cost, last year, $1,173,320 to move, one mile, the 78,228,000 tons of freight transported on our roads. The whole *cost* of freight transportation was about $140,000,000.

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In addition to the efforts made, and shared in by all, to develop the resources of the whole country, are those made by particular communities to attract to themselves as large a portion as possible of this trade by the superior facilities they seek to offer for its transportation. There is, therefore, in this country every possible stimulus to the study and practice of railway economy, and the results achieved, both in the construction and working of our roads, testify to a high degree of skill and perfection reached in each department. As such results have been mainly accomplished through the employment of *natural* forces or laws, they will continue to be enlarged, just in ratio to the degree that we employ or unfold such forces or laws.

Upon the subject of railway economy, as it relates to mechanical improvements, little need be said or urged. With a proper organization in other respects, these matters will take care of themselves. The great improvement now called for is the substitution of *steel* for iron, particularly for rails. With the heavy engine and high speed now used, the iron rail is speedily crushed. There is no doubt that the quality used has greately deteriorated. We have constructed railroads so rapidly, and upon such inadequate means, that cheapness in first cost has alone been regarded. The substitution of steel for iron will be an improvement as great as that effected when the heavy iron rail took the place of the *flat* bar. The increased means of most of our companies is enabling them to practice the true economy of using the best possible materials and methods to given ends. At the very moment that the need of steel is felt to be imperative, a mode for its manufacture has been discovered, by which steel rails are now manufactured at a cost very little exceeding that of iron rails, when the construction of railways was commenced.

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The construction of railroads in the United States has proceeded without reference to any general system, and without anything like supervision or oversight by the different states, from whom the authority to construct such works has been solely derived, except in the case of what are termed "Pacific Railroads," or of lines forming parts or branches of the same. At an early period, acts of incorporation were granted as a matter of course.

The future value of railways was so little foreseen, that nothing like monopoly or rivalry was thought of. The failure of the enterprises undertaken by the states between 1830 and 1840 had the effect to put an end to all attempts on their part to carry out elaborate systems of public works. The charters granted to private companies usually reserve the authority to repeal them, and to regulate the management of their roads. But the authority to repeal has never been exercised after a contemplated work has been constructed, and only in a very few instances have legislatures assumed to interfere with their management. Their incompetency to carry out an elaborate scheme requiring years for its accomplishment, or to redress abuses, is one of the striking characteristics of all free governments. Those administering them are changing places too rapidly to render possible any adequate conception or execution of a plan or system which shall give a reasonable amount of accommodation to the public, and secure a remunerative returns upon its cost. They have no ''vested right'' either in their places or honors, which any day may fall to another, and very little sense of personal interest in the results of their services. In countries where the government is the state, and where the rulers are a permanent class or order, and the people, as it were, their property, a constant care and watchfulness is exercised over every act of society. What are supposed to be remedies are promptly applied. But no government is capable of properly executing or administering *commercial* enterprises, and our own has wisely committed all such matters to the *people*, where they belong. There may be, as a consequence, a great lack of symmetry in the systems executed, and much money lost in unproductive schemes, but there is a satisfaction in knowing that the general gain will, in all cases, far outweigh any loss that individuals may suffer, and that the construction of any line, almost, results in an addition of value to the general stock of an amount equaling three or four times its cost. When no factitious advantage is to be had, the losers have only themselves to blame. Where no protection is to be expected from government, every reasonable facility and courtesy will be extended, as the best safeguard against competition. Where such inducements are removed by government protection, churls for officials and managers, and wretched accommodations, with exorbitant charges, will be the rule.

In most of the states the construction of railroads is provided for by *general laws* whereby, without any additional legislative authority, a certain number of persons may associate themselves together, and do any act necessary to accomplish their object. In such legislation New York set the example by the enactment of its General Railroad Law in 1850. It has been adopted in nearly all the great states, and in all the new ones. Wherever adopted, it completely overrides local and sectional legislation, and allows the perfect adaptation of the railroad system to the commercial wants of the country. Such legislation strikingly illustrates our tendency to national unity. Railroads and canals were at first undertaken almost universally as *local* works, and for local and sectional objects. Each state sought through their influence to magnify its own wealth and importance at the expense of its neighbors; or, at least, without allowing it any share in the advantages to be secured. A striking example of this wretched policy was the original location of the Erie Railway, which was made to terminate at Piermont, twenty-five miles from New York, in order to prevent the people of New Jersey from sharing in its benefits. The State of Pennsylvania, stretching from Lake Erie to the Delaware, sought, for a long time, to avail itself of its geographical position to cut off the states lying to the north and east from proper railroad communication with the West. But such a niggardly policy could not long be sustained, and that state, even, during the present year, has adopted a liberal *general* law, which renders the construction of railroads within it the common right of its citizens.

Commercial considerations, therefore, on a grand scale now exert a paramount influence in the construction and management of our railways. There are only two states, we believe, which assume, by virtue of their geographical positions, to levy an income upon the commerce and trade of the country—New Jersey and Maryland. The former derives the chief support of its government from transit duties imposed upon travel between New York and Philadelphia. The amount received the past year, and from income derived from shares in public works donated to the state as the price of their concession, equalled $500,000. The state of Maryland receives one-fifth gross, of all the passenger earnings between Baltimore and Washington. All the other states have abolished all such relics of the barbarous ages. These, in time, will disappear, even in New Jersey and Maryland. The commerce of the whole country will then be subject to no burdens but those that properly belong to it.

"The *resume* which we have given of the progress, condition and results of the railroads of the United States reflects, on the whole, great credit upon their management, and gives, at the same time, a reasonable expectation of still better results. More progress has been made, within a period of a little over thirty years, in the science of locomotion, than had previously been made during the existence of society. No physical achievement of the race will, in the magnitude and value of its results, bear a moment's comparison with the railway. The progress of the past is a sure guarantee for the future. The improvements that are being made in railway economy are steadily causing the securities of railroads to be taken up for investment and withdrawn from the arena of speculation. We see no reason for doubting that such in time will be the results with every work having real and substantial merits."*

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*Within five years from the publication of this glowing tribute to the progress of American railways, that is thirty-seven years ago, the *Financial and Commercial Chronicle*, then, as now, the foremost financial periodical in the country, published a list of 72 railway companies in the United States having a funded debt of over $258,000,000, which were in default for non-payment of interest. The average rate of such interest was over 7 per cent gold and ran as high as 10 per cent and never below 6 per cent gold. Many of the railway bonds of that period bearing 7 per cent were issued at a price that netted the holder 9 per cent or over and consequently cost the companies a like rate on the proceeds available for construction, equipment, etc.—S. T.

THE FIRST GERMAN RAILWAY

(Zeitung des Vereins Deutscher Eisenbahnverwaltungen.)

On December 7, 1910, seventy-five years had elapsed since the opening of the first German railway, the Ludwig line from Nuremberg to Fürth. The beautiful old town of Nuremberg, for centuries a centre of highly-developed art and flourishing commerce, has the distinction of being the first German town which understood how to profit by the brilliant success of the steam railway from Liverpool to Manchester which was opened on 15 September, 1830, and to carry out the scheme of building a railway, in order to connect it with its flourishing sister town, Fürth. The interesting early history of this line shows how difficult it was for human minds to grasp such remarkable innovations and how many obstacles arose to hamper the carrying out of the scheme.

We will here give some particulars of the creation of this line. The project of connecting Nuremberg and Fürth by a railway first matured in the mind of a Nuremberg citizen, Johannes Scharrer, the founder of the Nuremberg hop trade, who also subsequently remained the chief head of the undertaking. He was joined by men such as Platner, the great capitalist, Bäumen, the first mayor of Fürth, and others; and in 1832 they first published their plan, which had been well thought out both technically and economically. Its effect on public opinion was very diversified, as no experience on the subject was available. Determinations were made of the traffic between the two towns, and professor Kuppler, who had published an opinion, favourable to the project, in the *Polytechnische Zeitung,* after a survey, made a plan of the line, designs for all constructional works and a preliminary estimate of the cost. Thereupon the "provisional committee" which had been formed invited the public to subscribe for shares, and issued a prospectus in which attention was drawn, *inter alia,* to the importance of the invention itself, to the quickness with which passengers and goods could be conveyed, and to the good results of the Liverpool-Manchester line. The incalculable importance of the invention of railways was eloquently proclaimed, and it was stated that this means of communication, emulating the flight of birds, would make distances smaller, would bring states and nations nearer to each other, and give mankind a greater mastery over time and distance. The cost of the railway was estimated in the prospectus at 132,000 florins ($115,800), the yearly expenses at 12,800 florins ($11,225), the yearly receipts at 29,200 florins ($25,615), so that with a net profit of 16,400 florins ($14,390), the capital would receive dividends of 12 per cent per year. Shares of 100 florins ($87.50) were to be issued. The prospectus and the clear statements it contained were received in many quarters with favour, but were also subjected to attacks of all kinds, due to either personal ill-will, or to short-sightedness and nervousness. Among the difficulties, which the project encountered, not the least were the doubts which were expressed in technical circles. Detailed and interesting information about all these points is given in the clear, circumstantial and attractive work: *Die erste deutsche Eisenbahn mit Dampfbetrieb zwischen Nurnberg und Furth,* by Dr. Rudolf Hagen, which was issued in commemoration of the fifty-years jubilee of the line (published by Joh. Bernh. Schrag, Nuremberg), from which we have taken these particulars. We may also mention that the Bavarian government which had been expected to give its active support to the scheme, at first only showed very little interest in it. The government, at Augsburg, subscribed for only two shares of 100 florins ($87.50) each, "in order to show in this way its lively interest in the important scheme." And this small amount was not fully paid up until after the directorate had presented a petition to the king. Another obstacle was the project, which then first turned up, of making a canal from Munich to the Danube. In all probability the railway project would not have become carried out so quickly, had not King Ludwig given permission to call the railway the "Ludwig" line and also helped the undertaking in other ways. By 18 November, 1833 all the shares had been subscribed. On 16 December, 1833, the directorate addressed a petition to the king, asking for a charter and for approval of the regulations, and in this petition attention was drawn, *inter alia,* to the strategic advantages of the railway. The government recognized the favourable opportunity, of having a trial line built without any cost to the state, and granted a concession for thirty years. New troubles involving much loss of time next arose in connection with the purchase of the land. Denis, a native of the Palatinate, who had studied English and American railways during several years, and who at the time was district engineer attached to the government of the Isar district, did very meritorious work in connection with the building of the railway. Difficulties arose with obtaining the expensive wrought-iron rails from England, as they were not yet made in the country itself; obtaining the carriages was also not an easy matter, as the principle was adopted of utilizing home industries as much as possible. This principle also led to a lively dispute in the directorate when the question of purchasing a locomotive arose, for it was thought that a good one could be procured in Germany or in Belgium, while Scharrer and Denis had confidence only in English locomotives, which had already given successful results in practice. Accordingly, the first locomotive of the Ludwig line, called *Der Adler,* was supplied by Stephenson, at the price of 14,420 florins ($1,265). The three first-class, four second-class and two third-class passenger carriages cost together 10,444 florins ($9,160). The locomotive made an experimental run on 21 November, 1835, five carriages containing 90 passengers being hauled; the distance from Nuremberg to Fürth was covered in twelve to thirteen minutes, using only half the power of the locomotive. On 7 December the first regular train was run.

Although the success of this first German railway had a great influence on the German spirit of enterprise, yet it is very remarkable that the Ludwig line subsequently never became extended, as proposed by Scharrer and shown by him in the railway map annexed to his memoir. The line was never extended to the east and to the west, as Scharrer expected; on the contrary it has never been extended beyond its original length, and is nearly unique in this respect. But its importance lies in the fact that it set the whole of Germany an example which was worth following, and that it led the way to liberating the technical construction of railways from the influence of foreigners, from ''anglomania'' as Denis called it, and showed that the German engineers need not be inferior to the English. As to the rest, the published reports of the Ludwig line show that the expectation of the promoters, as expressed in the prospectus, that the enterprise would become a paying one, proved to be true. This line, which is the oldest and at the same time the shortest railway in Bavaria, is a member of the German *Verein.*

STATISTICS OF THIS ANCIENT AND INDEPENDENT RAILWAY FOR THE YEAR 1909.*

Ludwigs-Eisenbahn (Nuremberg-Furth).

Length (miles)	3.74
Capital cost	$457,990
Capital cost, per mile	$122,457
Locomotives, number	8
Passenger cars	35
Baggage and freight cars	6
Passengers carried	3,999,746
Passengers carried, one mile	13,887,274
Average journey (miles)	3.47
Passenger revenues	$94,309
Gross earnings	$99,959
Operating expenses	$82,960
Rates, expenses to revenues	82.99
Employes, number	91
Employes, compensation	$34,779
Average	382

*NOTE: These figures are taken from the last official statistics of German Railways, the road itself being distinguishable on the official map, running from Nuremberg 6 04 kilometers to Furth, where it ends abruptly.—S. T.

THE MINNESOTA RATE CASE

BY CHARLES E. OTIS,

Special Master in Chancery.

IN THE UNITED STATES CIRCUIT COURT,
DISTRICT OF MINNESOTA, THIRD DIVISION.

On May 4, 1908, ex-Judge Charles E. Otis was appointed by the Hon. Walter H. Sanborn, senior United States Circuit Judge of the Eighth Judicial Circuit, Special Master in Chancery to take testimony, examine the evidence, make all necessary computations, find and state the facts in several suits instituted by stockholders of the Northern Pacific Railway Company, the Great Northern Railway Company and the Minneapolis & St. Louis Railroad Company, to restrain them from putting in force certain orders of the Railroad and Warehouse Commission, reducing rates and fares in the State of Minnesota.

On September 10, 1910, the Special Master rendered his decision sustaining the position of the stockholders and filed an exhaustive review of the evidence and law in the case.

On April 8, 1911, Judge Sanborn entered a decree affirming the report of Special Master Otis and enjoined the enforcement of the reductions ordered by the Commission.

The statement of the case, facts and law, as set forth in the findings of the Special Master, making a pamphlet of 161 pages, have been condensed, with his permission, for the *Railway Library*—being confined, at the suggestion of Judge Otis, except as noted, to the case of the Northern Pacific, for the sake of brevity:

LEGISLATION AND MATTERS PERTAINING THERETO.

By Chapter 28 of the Revised Laws of Minnesota, 1905, the general supervision of railroad companies doing business in Minnesota is vested in the Railroad and Warehouse Commission, with power to adjust and fix rates and prescribe rules and regulations for the conduct of the business of such companies.

During the session of 1905 a joint resolution was passed by the Minnesota Legislature directing the Commission "to undertake the work of securing a readjustment of the existing freight rates in this state, * * * * to secure a substantial reduction in existing merchandise rates." At the same time funds were provided to enable the Commission to secure a physical valuation of all railroad properties in the state.

With reference to rates, complaints were almost invariably based on one of two claims—that somebody in the same or a nearby town was getting a better rate, or that the rate to some particular town was unreasonably high as compared with the rate to some other town on the same or some other line with reference to relative mileage.

Discrimination between localities and shippers, not excessive rates, was substantially the only ground of complaint.

Previous to this time the Commission had not undertaken to prescribe general schedules of tariffs covering all articles and commodities.

Pursuant to the mandate of this legislation, on September 6, 1906, the Commission made up and completed full schedules of rates, covering all merchandise, to take effect November 15, 1906. The schedule of rates so ordered was enacted into law by the Legislature in the spring of 1907.

At the same session (1907) the Legislature passed the so-called two-cent passenger law, prescribing two cents a mile for passengers twelve years of age or over, with baggage not exceeding 150 pounds, and one cent per mile for passengers under twelve years of age with baggage not exceeding 75 pounds. Previous to this the maxima had been 3 cents and 1½ cents, respectively.

The railroad companies put the 2-cent passenger fare into effect April 4, 1907, and were about to do likewise for the commodity rates when restrained by the injunctions obtained by the stockholders.

Summarized, the reductions in rates which may be charged by railroad companies for interstate transportation within the State of Minnesota, so made by its Legislature and Commission and challenged by these suits, are briefly, as follows:

1. Reduction in rates on general merchandise amounting to from 20% to 25%. (Commission's order of Sept. 6, 1906.)

2. Reduction in maximum rates on passengers amounting to 33 1/3%. (Sessions Laws of 1907, Chap. 176.)

3. Reduction in rates on grain, lumber, live stock and coal amounting to 7.37%. (Sessions Laws of 1907, Chap. 232.)

4. Reduction in in-rates in distributing stations amounting, in the Northern Pacific case, to 13.58%. (Commission's order of May 3, 1907.)

The Master held that if the rates prescribed were reasonable in fact and not an interference with interstate commerce the complainants would have no standing in a court of equity to compel a return to excessive rates. If, however, the rates prescribed were unreasonable and confiscatory or discriminated against interstate commerce, it was competent for the Court to adjudge their invalidity and compel a return to former or non-discriminating rates.

INTERFERENCE WITH INTERSTATE COMMERCE.

The question of first importance raised in these proceedings was whether the prescribed rates discriminated against and operated as a regulation of interstate commerce. The orders complained of were strictly limited to state commerce. Following the ruling of the Supreme Court in *Telegraph Company vs. Kansas* (216 U. S. 1.), that such laws passed by state legislatures, if directly or in their necessary operation, they burden interstate commerce, must be adjudged invalid. Upon this point the Master said:

"It must be true that there cannot be a dual control in so important a regulation as the fixing of rates, the same being of vital importance to the continued existence of the company as a going concern, and if state and interstate rates must bear a certain relation to each other, the standard must be fixed by the sovereign power, the Congress, which under the Constitution, is given power to regulate commerce among the states."

"A state," he continued, "has no right to burden interstate commerce for the benefit of its own business enterprises, or to subject it to 'any undue or unreasonable prejudice or disadvantage in any respect whatsoever.'"

The facts in regard to the state and interstate nature of the business of the Northern Pacific, as disclosed by the evidence before the Master, were summarized by him in these words:

"The Northern Pacific Railway Company is a corporation and common carrier owning, maintaining and operating lines of railway exclusive of lines in Manitoba and its interest in the Spokane, Portland & Seattle Railroad, comprehending on the 30th day of June, 1908, approximately 7,695.80 miles of track, of which

1,625.20 miles are in Minnesota. Its main line of railway extends from Superior, Wisconsin, and Duluth, Minnesota, which are situated side by side at the westerly end of Lake Superior, and from the cities of St. Paul and Minneapolis, Minnesota, in a westerly direction through the states of Minnesota, North Dakota, Montana, Idaho, Washington and Oregon, to the cities of Seattle, Tacoma and Portland, on the Pacific coast. Between Duluth and other points in Minnesota reached by it, the company has both a local and an interstate line passing through Wisconsin and joining the state line at Carlton, Minnesota, twenty miles westerly from Duluth. The company has a branch line which leaves the main line at Manitoba Junction, 225 miles westerly from St. Paul, and extends in a northerly direction, leaving the state of Minnesota at East Grand Forks, Minnesota, 320 miles from St. Paul, and entering the state of North Dakota at Grand Forks, North Dakota, which is at the same official distance from St. Paul, and running to Pembina, North Dakota, which is on the border line between North Dakota and Manitoba, and is 414 miles from St. Paul. It has another branch line which leaves the main line at Wadena, Minnesota, 160 miles westerly from St. Paul, and extends in a westerly direction, leaving the state of Minnesota at Breckenridge, Minnesota, 237 miles from St. Paul, and entering the state of North Dakota at Wahpeton, North Dakota, 238 miles from St. Paul, and running thence to Oakes, North Dakota, 311 miles from St. Paul. The main line of the company leaves the state of Minnesota at Moorhead, Minnesota, 250 miles from St. Paul, and enters the state of North Dakota at Fargo, North Dakota, which is 251 miles from St. Paul.''

Like facts are set forth in the cases of the two other companies.

It is then found that ''The whole of the railroad properties of each of said companies have for many years constituted, and still constitute respective single systems, and have been and are operated by each of said companies as such. The cars, engines and supplies of each company customarily have been and are used upon its system wherever required and without regard to whether the business in which they have been or are employed has been or is interstate business or business local to a state. It has always been and is impracticable and apparently is impossible to operate the property of either of said companies situate in any state separately or to carry on transportation of passengers or freight local to a state separately from interstate passengers or freight touching that state. Each of said companies customarily has carried and does carry interstate passengers and passengers local to a state on the same train and in the same car, and interstate freight and freight local to a state on the same train and, if less than carload freight, in the same car; and they could not and cannot practicably or in the exercise of any fair economy whatsoever do otherwise.''

Next the Master finds that by far the larger proportion of the business of each of said companies is *interstate,* the same being true of their business within the state of Minnesota. For example, in 1906 only 2.67% of the freight business of the Northern Pacific was local to Minnesota and but 12.33% of it touched the state; and only 5.79% of its entire passenger business was local to Minnesota, and but 67.21% of its passenger business touched the state.

Prior to the taking effect of the order of September 6, 1906, and the two cents maximum passenger fare law, the railways had maintained an equable basis for merchandise and passengers regardless of whether it was within Minnesota or interstate between Minnesota and an adjoining state.

Any substantial change in the basis of such rates, due merely to the fact that the transportation was interstate or local, or any substantial difference in rates as between local traffic and interstate traffic, it is found would constitute ''actual undue and unjust discrimination in fact.''

Conditions attending transportation to and from Superior, Wisconsin, and Duluth, Minnesota, are cited to show how any substantial difference in rates accorded to them would destroy the commerce of the city given the higher rates, and it was found that ''Failure by the Northern Pacific to maintain substantially as low rates between Superior and points in Minnesota as between Duluth and other points in Minnesota would seriously impair the power of the company to transact its interstate business between Superior and points in Minnesota, and would seriously depreciate the value of the company's property in Superior.''

The effect of the order of September 6, 1906, upon interstate as well as state rates is illustrated by the fact that ''On the same day that the Northern Pacific Company installed its rates in Minnesota as prescribed by the order, it reduced its interstate rates between Superior and points in Minnesota to an exact parity with its rates between Duluth and other points in Minnesota, its interstate rates between Grand Forks, Fargo and Wahpeton, North Dakota, and Minnesota points to an exact parity with its rates between East Grand Forks, Moorhead and Breckenridge, respectively, and other Minnesota points, and its interstate rates between Superior and Grand Forks, Fargo and Wahpeton, respectively, to an exact parity with its state rates between Duluth and East Grand Forks, Moorhead and Breckenridge, respectively. The reduction was substantial. For example, the reduction in the rate on first class from Superior to Fargo was from 65 cents per cwt. to 54.1 cents per cwt., and on fifth class from 27 cents to 21.7 cents per cwt.''

''These reductions,'' the report continues, ''were compelled by the necessary and direct effect of the operation of the order. Had they not been made, Superior could not have competed in business in Minnesota with Duluth; Fargo, Grand Forks and Wahpeton could not have competed with Moorhead, East Grand Forks and Breckenridge, respectively, nor could Superior have transacted business successfully with Fargo, Grand Forks or Wahpeton. Moreover, although the Northern Pacific suffered a substantial loss in revenue from its interstate business, it had the choice of submitting to that loss or of suffering substantial destruction of its interstate commerce in articles covered by the order between these localities.''

''Every rate,'' says the report, ''comprehends two terminal charges, the initial and the final, and a distance haulage charge. It is a cardinal principle of rate-making that a rate for a longer distance should be proportionately smaller than one for a shorter distance; that is to say, that a rate for 500 miles should be less than twice the rate for 250 miles, if conditions of transportation be the same. Because the rate for 250 miles includes two terminal charges, and if the rate for 500 miles were twice the rate for 250 miles, it would manifestly include the equivalent of four terminal charges. Even if the haulage charge were the same for a haul of 500 miles as for a haul of 250 miles, which is contrary to the rule generally applied in rate-making, the rate per ton mile for the 500 miles should be less than for the 250 miles, because in the one case the terminal charges would be spread over 500 miles and in the other over only 250 miles.''

''It is one of the fundamental dogmas of rate-making,'' says the Master, ''that the haulage charge per mile shall not increase with increasing distance if conditions be the same. * * * The Interstate Commerce Commission in the Spokane Rate Case has fixed the reasonable rate on first-class merchandise from St. Paul to Spokane of $2.50. Maintaining this rate from St. Paul to Spokane, and the Commission's schedule in Minnesota at the same time, necessarily involves the raising of the per mile haulage charge after the Minnesota state line has been crossed, or the charging a higher rate within Minnesota for its mileage proportion of long haul interstate business than for business local to the state carried on over the same rails and under the same conditions and involves necessarily undue and unjust discrimination in fact against localities westerly of the Minnesota-North Dakota boundary line.

"The Northern Pacific Company cannot maintain its present Commission-made rates between its eastern terminals and Moorhead and at the same time its present interstate rates from its eastern terminals to Butte without substantial discrimination in fact against Butte or localities intermediate between its eastern terminals and Butte. If it lowers its rates from its eastern terminals to Butte and intermediate stations to such an extent as to obviate substantial discrimination in fact, it must, to preserve the relation which has always existed, lower to a like extent its rates from its western terminals to Butte and intermediate stations. If, then, the Northern Pacific maintains the commission-made rates between its eastern terminals and Moorhead, it must either substantially discriminate in fact or destroy the general relation of rates which has existed for many years in the territory between the Missouri river and the Pacific coast.

"The proof is clear that conditions attending transportation are substantially the same in Minnesota and North Dakota and whether the transportation is local to either state or interstate between them. If unjust and undue preference or advantage is to be avoided, like rates must exist for like distances under like circumstances.

"For many years rates on coal from the various distributing points to localities in Southern Minnesota have borne such a relation as to admit of free competition of the various distributing points and of the carriers serving them.

"If the rates on coal prescribed by Chapter 232, General Laws, 1907, shall take effect, the result will be substantial reduction in rates on coal from Duluth to Southern Minnesota localities. Such a reduction will deprive all these various distributing points in Wisconsin, Michigan and Illinois of their power to compete with Duluth in its distribution of coal in Minnesota unless the carriers serving them shall reduce their interstate rates into Minnesota to a parity with those prescribed by Chapter 232 from Duluth. If such carriers shall reduce their interstate rates in Minnesota to a parity with the rates prescribed by Chapter 232, the relation which now exists between rates on coal from these various distributing points and localities in Northern Iowa and in South Dakota will be destroyed unless rates shall be similarly reduced from these various distributing centers to localities in these two districts."

Interstate rates on cattle, hogs, sheep and coarse grain would be affected in the same manner.

"Prior to the taking effect of Chapter 97, General Laws, 1907, the general basis of rates for the transportation of passengers between any two points on the Northern Pacific system had been for years three cents per mile for passengers of twelve years of age and over, and one and one-half cents per mile for passengers under twelve years of age.

"Chapter 97, General Laws, 1907, prescribes as a maximum for transportation of passengers wholly within the state of Minnesota two cents per mile for passengers of twelve years of age or over and one cent per mile for passengers under twelve years of age.

"After the maximum rates prescribed by Chapter 97 were installed, the sum of the locals between Moorhead and other Minnesota points westerly thereof was less than the then existing interstate rates between Minnesota points and points westerly thereof.

"The result of this disparity between the through interstate rate over Moorhead and the sum of the locals over Moorhead was this: In the first month after the taking effect of Chapter 97 the revenue for passenger business on the Northern Pacific between Moorhead and other Minnesota points increased 647 per cent over that for the corresponding month of the preceding year, while, eliminating Moorhead business, the revenue for passenger business within the state decreased 2 per cent. In June, 1907, the second month after the taking effect of Chapter 97, there were sold by the Northern Pacific Company 4,037 tickets between St. Paul or Minneapolis on the one hand and Moorhead or East Grand Forks on the other, as compared with only 172 such tickets in the corresponding month of the year before; and in June, 1907, there were sold only 173 tickets between St. Paul or Minneapolis on the one hand and Grand Forks and Fargo on the other, as compared with 984 such tickets in the corresponding month of the year before. In May and June, 1906, only one cash fare was collected on a train between Moorhead and St. Paul or Minneapolis; in those months in 1907 there were 1,168 full cash fares and 82 cash half-fares so collected.

"These facts compel the conclusion that the necessary, immediate, direct effect of the operation of Chapter 97 was to deprive the Northern Pacific Company of a substantial amount of its interstate passenger business through Moorhead.

"Notwithstanding the facility with which interstate passengers could avoid the discrimination against them by making two contracts with the Company, one of which should cover the mileage in Minnesota, discrimination in fact against the interstate passenger through Moorhead on the Northern Pacific still existed and was practiced. It existed against a passenger who, applying for a through ticket, did not know that the sum of the locals on Moorhead was less than the through rate, against the passenger with a trunk which he could not check through unless on a through ticket, against a passenger who was compelled to use a sleeping car.

"As soon as it reasonably could do so, the Northern Pacific remedied this discrimination by reducing all its interstate fares for passenger transportation through Moorhead to an amount no greater than the sum of the locals over Moorhead. Meantime and before tariffs establishing the new reduced interstate rates over Moorhead had been filed, the state of Wisconsin had enacted a two cents per mile passenger fare law, and the state of North Dakota a two and one-half cents per mile law. The rates, therefore, newly established by the Northern Pacific Company between St. Paul, for example, and points in North Dakota and beyond, were in general less than the theretofore existing rates by approximately one cent per mile for the mileage transportation in Minnesota and one-half cent per mile for the mileage in North Dakota. And the rates newly established by the Northern Pacific Company jointly with other companies for passenger transportation between points easterly of Minnesota and points on the line of the Northern Pacific were in general less than the theretofore existing rates by approximately one cent per mile for the mileage of the transportation in Wisconsin and Minnesota and one-half cent per mile for the mileage in North Dakota.

"These reductions in rates were compelled by the necessary, immediate and direct effect of the operation of the laws of the respective states above recited, not only in order that undue and unjust discrimination in rates might be avoided, but, as well, in order that the companies might transact interstate passenger business freely and without impairment of volume.

"Prior to the taking effect of the respective orders complained of and of the two cents maximum passenger fare law, the tariffs of the Great Northern and Northern Pacific Companies for the transportation of passengers or merchandise in Wisconsin, Minnesota, North Dakota and South Dakota were fair as between the different states, and the local tariffs in each state were fair as compared with the interstate tariffs between such states or any two thereof; and the tariffs now maintained by the companies and each of them for the transportation of commodities covered by Chapter 232 are fair as between these states, and the local tariffs in each state are fair as compared with the interstate tariffs between such states or any two thereof.

"The installation of the rates prescribed by the respective orders destroyed that fairness as to merchandise rates, the installation of the two cents passenger rates destroyed it as to passenger rates, and the installation of the rates prescribed by Chapter 232 would destroy it as to rates on commodities covered by it.

"It is wholly impossible for carriers situated as are the Great Northern, Northern Pacific and Minneapolis & St. Louis companies to maintain materially lower rates or a materially lower basis of rates or a different classification of subjects of transportation, or a different relation between rates for different classes of merchandise, for traffic wholly within Minnesota than for that between Minnesota and any of its neighboring states without unjust and undue discrimination in fact against the localities in the neighboring states, and without serious impairment of the volume of the interstate business of the carriers. Such lower basis of rates within Minnesota than between Minnesota and its neighboring states would result in the promotion of the growth and prosperity of localities in Minnesota at the expense of localities in neighboring states and the enhancement of the value of property in Minnesota and the serious impairment of the value of the property of all business men as well as of that of the carriers themselves in the neighboring states.

"Duluth and Superior, Grand Forks and East Grand Forks, Fargo and Moorhead and Wahpeton and Breckenridge are so situated that each pair must be considered for the purposes of rate making as one locality. Both as a practical matter of the operation of a railroad and in order that undue and unjust discrimination as between the members of any pair may be avoided, each city of each pair must have rates equal to those accorded to the other city. If different rates, a different classification or a different basis of rates be lawfully prescribed by one regulating power in or out of one city of any pair to those prescribed by another regulating power in or out of the other city of the pair, the carriers serving them both must, in order to avoid undue and unjust discrimination in fact as between them as well as to preserve their own power to transact business with each of them, adopt for each city the lower rates, or basis of rates, or classification prescribed for either city.

"If it shall be necessary for the companies involved, in order that discrimination may be avoided, or in order that the companies may preserve the volume of their respective businesses in interstate transportation free from impairment in volume, to install for their interstate business a basis of rates no higher than these respectively prescribed in the Act and Order complained of, and to extend the rates for their interstate long-haul business upon the principle provided in said Act and Order, the result will be a substantial diminution in the revenues of the companies from their interstate business. For example, the diminution in the revenue of the Northern Pacific Company for the year ending June 30, 1906, the last fiscal year prior to the taking effect of the Order of September 6, 1906, from its interstate business in transportation of commodities covered by Chapter 232 alone, if the basis prescribed by Chapter 232 had been applied to its rates for such interstate business, would have been $4,193,283.04; and the loss in such interstate revenue for such year for transportation of merchandise covered by the Order of September 6, 1906, if the basis prescribed by the Order had been applied to its rates for such interstate business would have been $4,119,761.96. The loss in its interstate business from passenger transportation, if the two cents maximum rate had been applied during such year, would have been $1,444,955.35, or a total loss, on account of the Acts and Orders complained of, of $9,758,000.35.

"If in order to prevent discrimination as between different states, it shall be necessary for the companies involved to apply for local business within the respective states, the same basis of rates as those prescribed for business local to Minnesota by the Acts and Orders respectively complained of, the loss in revenue to the companies involved will be substantial. For example, in the year 1906 the loss in revenue of the Northern Pacific Company, if the basis prescribed by Chapter 232 had been applied to its local business in transportation of commodities covered thereby in other states, would have been $198,540.51; and its loss in revenue, if the basis of rates prescribed in the Order of September 6, 1906, had been applied to its local business in other states for transportation of merchandise covered thereby, would have been $952,644.83, or a total loss on freight of $1,151,185.34; and if the two cents maximum passenger rate had been applied to its local business in other states, the loss in revenue would have been $990,908.82, or a total loss, under the Acts and Orders complained of, of $2,142,094.16.

"The foregoing findings of facts with respect to the effects of the prescribed rates upon interstate traffic, established as they are by convincing and undisputed testimony and supported by the records and papers of the respective companies, are made without regard to the justness or otherwise in fact of the interstate rates so affected by such local rates, and as this can be determined only by Congress or its administrative agent, the Interstate Commerce Commission, subject, of course, to the power of the Court in a proper case to prevent confiscation or extortion, this Court cannot, in this suit, determine the reasonableness or otherwise of such interstate rates. Before it can take cognizance thereof the question must have been presented to and passed upon by the proper Federal tribunal created for that purpose. Until then, as they are legal, they must be accepted as reasonable and the state can take no action which will compel a modification thereof as a condition of doing interstate business.

"Interference with interstate commerce arises from the fact that to prevent discrimination the rates must be modified so as to correspond substantially with the state-made rates and from the further fact that interstate commerce cannot in general be maintained at all unless they are so modified. It was directly held in *Louisville & Nashville Railway* v. *Eubank,* 184 U. S., 27, that the carrier cannot be compelled to adjust its interstate rates with reference to state-made rates, and since they must harmonize to prevent unjust discrimination and to enable the carrier to retain its interstate business, the state in its regulation of rates must do so with reference to their effect upon interstate commerce.

"The facts as found establish conclusively that the state in the rates prescribed by it has not kept within the limitations imposed upon it and has exceeded its constitutional powers in that such rates constitute a direct interference with and impose a burden upon interstate commerce and effect unjust discrimination as between interstate localities."

VALUATION OF PROPERTY DEVOTED TO PUBLIC SERVICE.

"In determining the remaining issues in the case, the initial step is to ascertain and determine the value of the property devoted to the public service and upon what basis such valuations should be made. In the leading case of *Smyth* v. *Ames,* 169 U. S., 522, adhered to and constantly cited in every rate case coming before the courts, the following language is used:

" 'It cannot be assumed that any railroad corporation, accepting franchises, rights and privileges at the hands of the public, ever supposed that it acquired, or that it was intended to grant to it the power to construct and maintain a public highway simply for its benefit, without regard to the rights of the public. But it is equally true that the corporation performing such public services and the people financially interested in its business and affairs have rights that may not be invaded by legislative enactment in disregard of the fundamental guarantees for the protection of property. The corporation may not be required to use its property for the benefit of the public without receiving just compensation for the services rendered by it.

* * * * * *

" 'We hold, however, that the basis of all calculations as to the reasonableness of rates to be charged by a corporation maintaining a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public. And in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stocks, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted from it for the use of a public highway than the services rendered by it are reasonably worth.'

"Here we have a clear declaration that a corporation performing a public service cannot be required to use its property for the benefit of the public without receiving just compensation therefor, not *some* compensation, but just and reasonable compensation, based upon the value of the property. There are, of course, exceptions to this rule. Under no circumstances can the rates be excessive, extortionate or unreasonable. They must be just to the public as well as to the carrier. If the road was unwisely conceived, unfavorably located and not constructed in response to public demand, a return upon such value is not to be expected if it compels unjust rates. But no conditions exist in these cases to take them out of the general rule.

"It also appears from this and subsequent cases that it is the present value of the property which is to be taken as a basis of rates. As again stated by the same Court in *Wilcox* v. *Consolidated Gas Company,* 212 U. S., 19: 'There must be a fair return upon the reasonable value of the property at the time it is being used for the public * * * and we concur with the court below in holding that the value of the property is to be determined as of the time when the inquiry is made regarding rates. If the property which legally enters into the consideration of the question of rates has increased in value since it was acquired, the company is entitled to the benefit of such increase. This is, at any rate, the general rule.'

"This clearly shows that the company is to share as well as the public in the general growth and prosperity of the country. It would seem, therefore, that the value of these properties can best be determined by reference to the cost of reproduction at the present time. As stated in the Wilcox case, cited in the decision rendered by the lower court upon a review of prior decisions of the Supreme Court of the United States:

" 'It is impossible to observe this continued use of the present tense in these decisions of the highest court without feeling that the actual or reproductive values of the time of inquiry is the first and most important figure to be ascertained.'

"The roads under consideration were constructed and completed many years ago and what may have gone into them, if it could be determined with reasonable certainty, would not take into consideration the changed condition of the country since their original construction, its growth and prosperity—in which the companies are entitled to share—and by reason of changed conditions and lapse of time it has little weight in arriving at present values. As stated by Judge Hook in the recent case of *Missouri, Kansas & Texas Railway Company* v. *Love, et al.,* in this circuit:

" 'There is another matter to be regarded, not specifically mentioned in the above excerpt from the opinion of Mr. Justice Harlan. An established railroad system may be worth more than its original cost and more than the mere cost of its physical reproduction. It has passed the initial period of little or no return to its owners which, of greater or less duration, almost always follows construction and is not infrequently marked by default and bankruptcy. The inevitable errors in its building, which finite minds and hands cannot avoid, have been measurably corrected, time and effort have produced a commercial adjustment between it and the country it was intended to serve, relations have been established with patrons, and sources of traffic have been opened up and made tributary. In other words, the railroad, unlike one newly constructed, is fully equipped and is doing business as a going concern. It has attained a position after many experiences common to railroad enterprises which entail loss and cost not paid from current earnings and which correspondingly make for value.'

"It is here proper to say that the foregoing decision was written in a very carefully considered case, in which may of the issues were practically the same as in the instant cases, and wherever applicable it must control the Master in determining the questions here raised. And this is so not only because it is a decision of one of the judges of this court, but because it is in harmony with other like decisions of this court and of the Supreme Court of the United States and contains, as the Master believes, a comprehensive and accurate statement of the law and discloses a lucid conception and clear expression of the facts which are very generally found to exist in all these railroad rate cases. Practically everything contained in that decision is applicable to or has a more or less direct bearing upon the cases here under consideration, and completely covers and denies many of the contentions of counsel for the state—urged at great length and with marked ability before the Master.

"In the light of this decision and others therein referred to and approved, our first duty is to ascertain the fair value of the property devoted to the public service.

"To this end a large volume of testimony was produced before the Master on behalf of complainants and the state, respectively, as to the reproduction cost of such property—and by such property is included only that which is used for the benefit of the public and which, with the revenue directly or indirectly derived from such use, is alone to be considered in determining the question of a reasonable rate. *Other revenues and other properties the company may have, but as to them the public has no concern.*

"Prior to suit brought, the state by its Railroad and Warehouse Commission called upon the defendant railroad companies and all other like companies in the state for a statement of all the properties of the companies, respectively, devoted to public use, with the valuation and the cost of reproduction new within the state, such statement to be made and returned upon itemized blank forms or schedules furnished for the purpose consisting of thirty-nine different items, into which divisions were to be made, and which when filled out would constitute an estimate of cost of reproduction of all the physical properties of each of said companies as made by it.

"This led to a personal examination of the physical properties of the railroad companies which was made by the state's engineer, employed for the purpose, and also by the agents and officers of the respective companies, and such schedules as so filled out and returned, with sundry modifications thereof by them made, have been produced before the Master and testimony in support thereof was given by witnesses making such examinations. Three competent and reliable real estate agents in each of the cities of St. Paul, Minneapolis and Duluth were selected by the railroad companies to make an appraisal of the terminal properties, exclusive of improvements, of each of the roads in their respective cities, and the valuations placed upon the properties by said several sets of appraisers in their respective cities, supported by their testimony produced before the Master, have been used by complainants as a basis for terminal values in said respective cities. These examinations and appraisements of railroad physical properties were made in the years 1906 and 1907 and the valuations so found were brought up to June 30, 1908, by adding thereto the valuation of properties acquired after such examinations and appraisements were made at the actual cost thereof.''

The Master's finding of value in Minnesota as of June 30, 1908, is as follows:

Items.	Northern Pacific.	Great Northern.	Minneapolis & St. Louis.
1. Lands for right of way, yards and terminals	$21,024,562	$ 25,172,650	$ 5,999,397
2. Grading, clearing and grubbing	12,331,541	21,685,802	2,551,960
3. Protection work, rip-rap, retaining walls	374,091	850,069	52,240
4. Tunnels	253,250	....	....
5. Cross-ties and switch-ties	3,657,576	5,460,809	1,149,829
6. Ballast	1,960,969	3,861,360	357,855
7. Rails	5,645,307	9,053,977	1,540,392
8. Track fastenings	727,228	2,087,615	258,561
9. Switches, frogs and railroad crossings	303,717	300,519	66,807
10. Track laying and surfacing	1,600,591	2,207,753	384,751
11. Bridges, trestles and culverts	3,586,063	6,664,729	1,025,827
12. Track and bridge tools	28,073	54,450	27,791
13. Fences, cattle guards and signs	471,609	448,864	141,606
14. Stockyards and appurtenances	37,098	81,600	55,704
15. Water stations	436,489	569,900	80,637
16. Coal stations	120,039	202,200	25,682
17. Stations, buildings and fixtures	920,423	1,561,200	239,434
18. Miscellaneous buildings	1,054,874	1,446,445	32,901
19. Steam and electric power plants, gas plants	196,338	413,752	58,050
20. General repair shops	1,162,934	1,470,765	180,588
21. Shop machinery and tools	529,322	953,531	101,875
22. Engine houses, turn tables and cinder pits	1,026,246	727,100	148,303
23. Track scales	38,520	39,700	8,421
24. Docks and wharves	768,306	37,500	....
25. Interlocking plants	114,430	193,268	15,674

Items.	Northern Pacific.	Great Northern.	Minneapolis & St. Louis
26. Other signal apparatus	....	116,046	2,594
27. Telegraph and telephone lines	285,145	672,637	27,109
28.			
28½. General office furniture	73,654	....	....
29. Solidification of roadbed (absorbed in above.)			
Total, 1 to 28	58,728,685	85,934,241	14,533,988
30. Engineering, superintendence, legal expenses, 4½%, 1 to 28	2,785,036	3,867,040	690,364
31. Locomotives	3,454,040	5,469,270	698,163
32. Passenger equipment	1,349,829	1,886,178	341,006
33. Freight car equipment	7,519,722	12,411,265	1,998,345
34. Miscellaneous equipment	372,477	482,909	86,938
35. Marine equipment	....	....	....
Total items, 1 to 34	74,209,789	110,050,903	18,348,804
36. Freight on construction material	absorbed	1,700,043	Inc. in #39
37. Contingencies, 5%, 1 to 34	3,710,479	4,367,826	Inc. in #39
38. Stores and supplies in Minnesota	2,658,976	3,240,178	238,589
39. Interest during construction, 4% 2½ years, Items 1 to 36	7,420,957	17,880,150	1,834,880
40. Interest in terminal properties, St. Paul depot, Duluth depot, Minnesota Transfer	2,204,344	1,186,191	1,186,191
	$90,204,545	$138,425,291	$21,608,464

In the several cases, the Master has briefly stated his reasons for the findings as to each item. Those for the Northern Pacific are:

Item 1. Lands for right of way, yards and terminals.

This amount is made up as follows:

Terminal properties, St. Paul appraisement of Read, Watson & Taylor, as modified by railroad company	$ 7,645,100.24
Add 5% for cost of acquisition and consequential damages	382,255.01
Property acquired after appraisement	328,725.69
Minneapolis, appraisement of Elwood, Barney & Ridgeway, as modified by railway company	4,027,616.17
Add 5% for acquisition and consequential damages	201,380.80
Property acquired after appraisement	227,737.26
Duluth, appraisement of Stryker, Mendenhall & Little	3,602,443.43
Add 25% for railway value, cost of acquisition and consequential damages	900,610.85
Total value of terminals	17,315,869.45
Lands outside of terminals	3,708,693.45
Grand total	$21,024,562.90

"In arriving at the foregoing valuation of terminals, upon a careful examination of the testimony, the Master has taken the valuation of the terminal properties made by the three appraisers appointed by the railroad companies in each of the three cities named who gave their testimony in these cases as found in the record and made such valuation a basis for his conclusions. He is of opinion that the reductions made from such valuations by the Northern Pacific Company as to its properties in St. Paul and Minneapolis were clearly justified by conditions differentiating the properties upon which such reductions were made from other properties valued by the appraisers and which were not fully appreciated by them. They were much farther removed from the business centers of the cities and partook more of the nature of suburban property.

"While it is true that the highest value of these terminal properties is their adaptability for railroad purposes and they must be acquired in a continuous tract suitable and convenient to meet the demands of the business and traveling public, thus largely enhancing their value, yet it is not true that these values for such purposes are limited only by the needs of the company and upon the theory that it must have the property or abandon the enterprise. It is not the needs of the company, but the peculiar fitness and adaptability of the property for railroad purposes which gives it an enhanced value—often very much greater than for any other purpose. The fact that there is other property equally available in the immediate vicinity that a line of road of substantially the same efficiency and answering a like purpose can be secured by changing its course of the location of terminals may be properly taken into consideration as bearing upon railroad values. While it is true that in these cases these particular terminals and rights of way are the subject of valuation, and no other, still such valuation must not be based upon the assumption that the companies must have them at any price and must pay anything the owner sees fit to exact, but should be determined and controlled, as far as may be, by a survey of the whole situation, and comparisons, where they can be made, with other properties which are in like manner available.

"The right of eminent domain is given to the company for the purpose of preventing the property owner from taking advantage of the necessities of the company as to any particular tract. While it is intended to secure to him its full and fair value for any purpose for which it is best adapted—and to this end an appeal is given to the courts from unrighteous awards—we are not to lose sight of the fact that railroads must be constructed along continuous lines and that the topography of the lands through which the lines are projected has much to do with their availability for railroad purposes and that such availability necessarily and properly enhances their value, for which the owner is entitled to compensation, and so it comes about that properties so available and situated for the purpose have a much greater value than other adjoining or adjacent properties not so conditioned.

"The Master is of the opinion that the appraisers of the St. Paul & Minneapolis terminals were fully impressed with their value for railroad purposes and their appraisement, as verified by them before the Master and as modified in the Northern Pacific case, is a generous valuation and should be accepted as full railroad value of the terminal properties and has been by him so accepted with an addition of five per cent to cover cost of acquisition and consequential damages, and which seems ample for the purpose in the large cities. The peculiar location of the properties did not seem to require a large increase on this account.

"In Duluth, the appraisers were much more moderate in fixing values and seemed to have adjusted the same with reference to the adaptability of the property for general business enterprises and not to have taken into consideration their special and increased value for railroad purposes. It is determined that their appraisement, increased by twenty-five per cent thereof, all things considered, will fairly cover reproduction cost, and their valuation is fixed at such sum accordingly.

"The Master has not overlooked the testimony offered by the state bearing upon these valuations and has given to it such consideration as in his opinion it was entitled to. It is proper to say, however, that it has not impressed him as entitled to much weight. The avowed purpose of the state was to get away from opinion values as much as possible, owing to the fact that witnesses are necessarily and unconsciously influenced by the interests of those at whose instance they are called, however fair and unbiased they may intend to be—considerations which the Master in fixing values has kept in mind. To this end the state has not offered the opinion of any witness as to the value of any of these terminal properties—

ignoring, as it would seem, the fact that real estate values are necessarily and largely a matter of opinion when applied to any particular tract or parcel of land. As a substitute therefor, the state's engineer and chief witness on this subject has adopted a method, in each of the three terminal cities, substantially as follows, taking the city of St. Paul as an example:

"He ascertained from the records the selling price of genuine sales of land for a period of years, and amounting to a large number, in every part of the city. The selling price of the lands without improvements, so far as this could be ascertained, was compared with the assessed value thereof, and it was found that on the average the assessed value was about sixty per cent of the selling price of such lands, and from this comparison the market value of the lands for general purposes was ascertained. Then the lands at varying width on each side of the side of the center line of the railroad land to be valued was divided into sections so that the lands in each section, according to his judgment, should be as nearly as practicable of like value, and the assessed value of the lands in such section was obtained, and such assessed value was determined to be sixty per cent of the market value of the lands assessed. The market value, or, as he styles it, the "true value," so found was then applied to the railroad lands within the section, and to find their railway value, seventy-five per cent thereof was added to such market value, it having been determined by him that railway companies have to pay on the average seventy-five per cent more for properties required by them than the market value as so found.

"Such, in brief, is the state's method of producing terminal property values, and generally known as the assessment and sales method.

"The evidence shows that the railroad lands in St. Paul constitute about eight per cent of all the assessed lands in the city, and, distributed among all the railroads owning terminal properties, each has but a very small per cent thereof. These considerations, added to the notoriously gross inequalities of assessments, compel the Master to give little weight to testimony of this character. On the other hand, he does not conceive he is bound to accept opinion testimony as absolute, but only as a large determining element in connection with all the facts and circumstances disclosed in the evidence, and this has been done in reaching his conclusions. He has given careful consideration to actual purchases recently made in acquiring property for railroad purposes and cited to show that they substantiate values fixed by the witnesses on either side, for of course they are of great value for such purpose.

"No deduction has been made for street crossings or parts of streets used for right of way held under rights acquired from the respective city authorities without acquisition of the fee. For railroad purposes these rights are substantially as valuable as if held under absolute title. They are permanent in character and in case of reproduction would cost practically as much as private property.

"With reference to right of way values outside of terminals, opinion testimony has been submitted by both parties, and, save in the Minneapolis & St. Louis case, there are wide differences between them. They have both used multipliers, generally of three, to cover cost of reproduction over market value. That is, the market value of adjacent lands has been ascertained and applied to the right of way lands and such value multiplied by three to ascertain what it would cost a railroad company to acquire the property. Whether this multiple has been used in the same manner, having in mind the same basis, is somewhat doubtful. In determining such basis the Master believes the witnesses for the complainants have been somewhat expansive, influenced measurably by the increased value for railroad purposes over its ordinary market value for farm purposes, and have used too large a multiplier. At the same time, the testimony of the chief witness for the state is much impaired by the fact that he evidently based his estimates upon valuation as fixed by the complainants' witnesses, of which they are found to be, in some fifty-two villages on the Northern Pacific road, an exact per cent and ranging from twenty to eighty per cent lower than such valuation. It is not doubted that he made as careful and painstaking effort, within the limited time he was able to devote to the purpose, as was practicable to ascertain and determine the market value of the properties appraised, but the weight of such testimony would have been manifestly greater if valuations had been independently fixed by him without regard to those previously made by the railroad company. At the same time the fact that his values of such property in the Minneapolis & St. Louis case, as also of much other property on that line of railway, were so nearly the same as the value of the chief witness for complainants in that case that they were able to compromise their differences has a tendency to corroborate his values on the other roads.

"Upon careful consideration of the evidence and all the circumstances thereby disclosed bearing on the question, seventy-five per cent of the valuations as fixed by complainants' witnesses has been determined upon as the fair reproduction value of the property in the Northern Pacific and Great Northern cases."

"Item 2. Grading, clearing and grubbing.

Amount allowed $12,331,541.52

"After allowance by state for adaptation and solidification placed by it in an item by itself, and by complainants included in this Item 2, the difference between the parties is substantially $850,339.68, and is fully accounted for by inadequate unit prices and insufficient quantities adopted by the state's witness as the basis of his estimate."

"Item 3. Protection work, rip-rap and retaining walls.

Amount allowed $374,091.53

"The state's testimony would very materially increase this amount.

Amount allowed......................$253,250.00

"The chief difference between the parties concerning this item is as to the allowance of anything for the Seventh street viaduct, so-called, in the city of St. Paul, constructed by the city after the road was built. The Northern Pacific Company did not construct this tunnel, nor does it appear from the evidence that even under the latest decisions of the courts it could have been compelled so to do. It is, so far as appears, a permanent structure not likely to require repair or replacement; at least the evidence does not disclose to the contrary. It forms an adequate passageway for the movement of trains, as much so as if created by natural conditions, and is substantially different from overhead bridges and like structures which the company could be compelled to reconstruct and maintain and which will require frequent repairs, renewals and replacements. If such were required, it may be assumed, in the absence of testimony to the contrary, that the city would be obliged to do the work and that the company's rights were properly safeguarded when it consented to the construction of a causeway over its right of way.

"Item 5. Cross-ties and switches.

"Amount allowed....................$3,657,576.70

"Accepted as claimed by complainant and includes transportation.

"Item 6. Ballast.

Northern Pacific case. Amount allowed.$1,960,969.00

Same unit price as Great Northern case, 62 cents a yard. In the Great Northern case it was found that "The main difference between the parties is unit prices. A careful analysis of the testimony justifies the prices and quantities claimed by complainants of 62 cents per yard. The state clearly overlooked items of expense in a very considerable amount in the unit prices of 45 cents per yard adopted by it. Other reliable testimony fixes such prices much higher than those above allowed, while complainant's chief witness, from actual measurements on the ground and records of the company, was best qualified to testify as to quantities.

"Item 7. Rails.

Amount allowed....................$5,645,307.73

"This includes handling, inspection and transportation to central points of each section under construction.

"Item 8. Track fastenings.

Amount allowed......................$727,228.37

"This is the amount claimed by complainant. If acquisition after state's estimate was made is excluded, the amount allowed is substantially less than the state was willing to concede."

"Item 9. Switches, frogs and railroad crossings.

Amount allowed......................$303,717.80

"The difference between estimates of the respective parties is not large and for the most part arises from additions made after state's estimate was made. If Items 8 and 9 are taken together, there is substantial agreement between the parties."

"Item 10. Track laying and surfacing.

"Amount allowed.....................$1,600,591.56

"In taking the amount claimed by complainant as the amount allowed, the fact is not overlooked that 439.476 miles of road is allowed for at the rate of $1,050 per mile instead of $760 per mile as in the other cases. The latter figure covers only such surfacing as is necessary for ballast and construction trains. In taking the higher figure it is not contemplated that the surfacing will be immediately followed by ballasting, but that it will leave the road in condition suitable for commercial business and that it will be followed by ballasting at some later time. A similar division of work is not found in the other cases, where it seems to be assumed that surfacing will be immediately followed by ballasting to make a completed road ready for operation.''

''Item 11. Bridges, trestles and culverts.

''Amount allowed...................$3,586,053.00

''Allowing for construction after state's estimate was made, there remains a difference between the parties of $896,072.21. The state bases its figures, apparently, in a large measure upon the reports made of its work by a number of other important railroad lines. Its engineer made use of these reports in making up the estimate in connection with his own very considerable knowledge and experience in such matters—and such estimate is not to be ignored. It is to be observed, however, that reports of other companies not supported by evidence as to basic facts should be received with caution. Exhibit 86—Darling—discloses the difference between the parties with respect to the items of work making up the total aggregate and actual prices paid for such items in recent years, from which it appears that the unit prices so paid are considerably higher than those used by the state. Upon careful review of the whole testimony it is determined to allow to complainant on account of this item a sum equal to two-thirds of this difference; that is, state's allowance, $2,578,014, plus new work, $410,658, plus two-thirds of $896,072 equals $3,686,053.''

''Items 12 to 28 inclusive, and 31 to 34 inclusive.

''Northern Pacific and Great Northern cases:

''As to the foregoing items in each of the two cases, after allowing complainants for acquisition after state's estimates were made, it appears that the total value thereof as conceded by the state exceeds the amount claimed by the complainants who in their brief assume a substantial agreement. It is determined that in the Northern Pacific case the valuation of said items in the aggregate amounts to the sum of $20,272,398.23 and in the Great Northern case to the sum of $28,838,580. The valuations placed on each of the items making up such aggregate valuations, respectively, by the witnesses for complainants, are found to be fair and reasonable and are made part of the summary schedule to follow. As the aggregate is less than conceded by the state it cannot complain.

"Item 30. Engineering, superintendence and legal expenses.

"Amount allowed....................$2,633,946.00

"This is 4½% on Items 1 to 28.

"Item 36. Freight on construction.

"In this case this item has not been kept separately but is included as a part of the cost of all items requiring such service."

"Item 37. Contingencies.

"Amount allowed....................$3,710,479.00

"The amount here allowed is 5% on Items 1 to 34 and corresponds to the state's method, and in view of present knowledge—making definite many things which would in a road projected into new territory be uncertain—the amount seems ample."

"Item 39. Interest during construction.

"Amount allowed....................$7,386,215.00

"This is interest at 4% for 2½ years on Items 1 to 36."

"Item 40. Interest in terminal properties.

"Amount allowed......................$2,204,342.

"The situation with respect to the St. Paul Union Depot and Minnesota Transfer companies was found to be identical with that of the Great Northern company where the valuation was of the one-tenth interest owned by the company in the two terminal properties named. Such ownership is not direct but is evidenced by stock in subsidiary corporations in whose name the properties are carried and operated for the sole and exclusive benefit of the respective railroad companies which own the stock and make use of the properties as an operating tool and as part of the properties of their respective lines of railroad. These companies are substantially joint owners of the property and as a matter of convenience and to more readily adjust accounts as between themselves growing out of the several use by each of them as so made of it, an agency for the purposes is created by an intermediary corporation under their direct control. To such agent each pays for such use of the property and charges the amount paid in its expense account, and dividends, if any, go into the revenue account as operating expenses and revenues.

"These subsidiary corporations are mere agencies operated for and wholly dependent upon the railroad companies who own the stock and in no sense are they independent enterprises engaged in business on their own account. In the evidence and all the proceedings before the Master it has been by all parties assumed that such was their character, and this being so the properties thereof should be considered as property of the companies to the extent of their respective interests as represented by stock.

"These terminal properties, located as they are and used for receiving and discharging passengers and for receiving, handling, transferring and forwarding freight, are of exceptional value and importance and the facilities so provided are found to be fully worth the amount claimed therefor by complainants and such amount has been taken in each of the cases.

"With respect to the Duluth Union Depot and Transfer Company, the Northern Pacific company owns all the stock and makes use of the property of the company as its own by the operation of its line of road; it is simply an operating tool and transacts no business on its own account or otherwise than as an agent of the Northern Pacific company, and its properties should be valued as belonging to that company.

"In this case it was conceded at the close of the argument before the Master that the Big Forks and International Falls Railway and the Minnesota and International Railway had not been made to appear as part of the Northern Pacific system, and they have not been included in the valuations which have been made."

DEPRECIATION.

"Having thus found the cost of reproduction new of these several railroad properties, the question remains, what if anything shall be deducted for depreciation.

"It is established that the roadbed is constantly increasing in value. It becomes solidified, embankments and slopes of excavations become settled and stable and so the better resist effects of rain and frost. It becomes adjusted to surface drainage and the adjustment is made permanent by concrete structures and rip-rap, and in other ways a roadbed long in use is far more valuable than one newly constructed. On the other hand, everything on and above the roadbed depreciates from wear and weather-stress. The life of a tie is from eight to ten years only. Structures become antiquated, inadequate and more or less dilapidated. Ballast requires renewal, tools and machinery wear out, cars, locomotives and equipment, as time goes on, are worn out or discarded for newer types. A large part of the depreciation, however, is taken care of by constant repairs, renewals, additions and replacements, a sufficient sum being annually set aside and devoted to this purpose, so that this, with appreciation of roadbed and adaptation to the needs of the country and of the public served, together with working capital hereinafter mentioned, fully offsets all depreciation and renders the physical properties of the road not less valuable than their cost of reproduction new. This conclusion is fully supported by the evidence and also justifies the language hereinbefore cited from the Missouri, Kansas & Texas Railway case, decided by Mr. Justice Hook.

"There is another element which may properly be considered in connection with the question of depreciation and as an offset to it. It is necessary that the companies should have on call a large sum of money for the conduct of the business and to meet emergencies. No doubt, a large part of it draws a low rate of interest while on deposit in bank, but it must be that very considerable amounts are idle and unproductive and must be considered as an element of value in the matter of rate-making.

"In view of all the foregoing considerations it follows without question that there should be no deduction on account of depreciation."

Stocks and Bonds as Affecting Value.

"There was produced before the Master reliable evidence as to the average market value of the stocks and bonds issued by the Northern Pacific Company for a period of five years ending April 30, 1908, and then outstanding, such average value amounting in the aggregate to the sum of $509,824,723.

"The total track mileage claimed by Complainant's Exhibit 2 is 8,146.45 miles. From this must be deducted 150.65 miles for the Minnesota and International line and Big Forks and International Falls line, improperly included, and also lines in Manitoba under lease and not operated as part of the system, amounting approximately to 300 miles, the exact amount not being definitely shown by the evidence. This leaves 7,695.80 miles. The track mileage in Minnesota is 1,625.20, or substantially 21 per cent of the whole. Taking this per cent of the stock and bond valuation gives $107,063,191, which considerably exceeds the cost of reproduction new, but it must be noted that the value of stock is based on all the assets of the company and is not limited to value of property devoted to public service, and its balance-sheet for the whole system of April 30, 1908, shows a clear surplus of $52,900,073, while some of its assets, notably the Northwestern Improvement Company stock, is apparently of far greater value than as listed. Assets and property not devoted to public service have not been valued, and as they are a large element in stock valuation it follows that value of bonds and stocks is wholly unreliable and cannot be used in these cases as an element in determining the value of operating property or as a basis for rate-making.''

ORIGINAL COST OF CONSTRUCTION.

''A large amount of evidence was produced before the Master for the purpose of showing actual cost of construction of the entire railroad systems from the organization of the original companies and by them and by their successors, the present companies, down to April 30, 1908. This could be shown only by the books and records of the two companies, the Northern Pacific and Great Northern, and in the early history of the original companies these are somewhat obscure and uncertain and, by reason of lapse of time, cannot be verified by other proof.

''The investment cost, in the Northern Pacific case, amounts to the sum of $369,252,755. In this aggregate is included an item of interest during construction amounting to $4,534,882, which is a proper credit, for reasons before stated.

''There are also included items aggregating $24,709,164 for discounts made and commissions paid in disposing of its bonds. This, of course, was a necessary and proper expense of the company, and if required to render an accounting it would be entitled to take credit therefor, just as it would be allowed in an accounting demanded with respect to any other business in which any corporation or private person might be engaged. It cannot be said, however, that it is money which has actually gone into the road, but rather an expense which the company incurs for the purpose of procuring such money. If rate-making is to be based upon actual cost, it would seem that such cost must be measured by the money necessarily expended in producing the construction without regard to whether those undertaking the enterprise have the same or must borrow for the purpose—a matter in which the public has no concern. If allowed interest during construction on the money invested, more should not be asked; otherwise, the rate would be directly affected by the good credit or otherwise of those undertaking the work. It seems that formerly and down to 1907 the Interstate Commerce Commission permitted a credit for this item of discount but now disallow it.

"The total investment of $369,252,755 above mentioned also includes an item of $32,573,036, the basis of which is an item found in an old ledger and noted in Exhibit 28 as 'Claims of old stockholders recognized in reorganization representing net cost in issue of new stock less proceeds of lands, $32,753,036.15,' and for which stock was issued and credit taken therefor. It seems probable that this stock was issued without consideration, and the fact that it was never included in the annual reports to the state, as shown in Exhibit V, tends to discredit it, and as there is no supporting evidence it should be disallowed. With these deductions, the cost of construction account is reduced to $312,243,555.

The Minnesota track mileage, as before stated, is substantially 21 per cent of the track mileage of the whole system, and if the above cost were proportioned accordingly the amount assignable to the state is 21 per cent of $312,243,555, or a total sum of $65,571,462. This is considerably less than the valuation of the physical properties as found and makes no allowance for appreciation of property incident to the growth or prosperity of the country in which the company is entitled to share.

In support of his finding that the cost of reproduction new is the fairest and most equitable basis upon which to predicate rates, the Master makes the following quotations:

From Prof. B. H. Meyer, Interstate Commerce Commission, as a member of the Wisconsin Railroad Commission, in the Buel case:

The method which satisfies in the highest degree the requirements of the valuation of railway systems as a whole as well as the distribution of the total values of such systems among states is the inventory method. This is a composite method, each constituent element in which is designed to solve one phase of the general problem of valuation and value distribution. The basal principle of the method is an engineer's estimate of the cost of reproduction of all physical properties new and in present condition, the latter being usually expressed in terms of per cent of the former.

Again he has said,

The cost-of-reproduction method carries with it a greater degree of demonstrable certainty and conviction than all the others which have been proposed."

And from the report of the Minnesota Commission to the Legislature, where it said:

It is uniformly held that the cost of reproduction is one of the very important elements in determining what is a reasonable rate and certainly is the strongest kind of evidence of the fair value of the property. The Commission has always recognized the carrier's right to earn a reasonable return on a fair valuation of its property, and has always had this in mind in every rate adjustment it has made. The valuation will be of great value in sustaining the Commission and the legislature in pending legislation should the contention be made that the rates in controversy will not produce a fair return on the property used, and it can be used in any further readjustment of rates that the Commission may deem it advisable or necessary to make.

Roads Constructed and Maintained Pursuant to Public Demand.

"It is true of these lines of railway," says the Master, "that they are efficiently, economically and honestly managed; that they have been located and constructed pursuant to a public demand and that the public rather than dispense with the service of any of them can well afford and will gladly pay such rates as will produce a full and fair return on cost of their reproduction—such return as others engaged in business of similar character and of like hazards and uncertainties are accustomed to receive, and rates sufficiently high for such purpose would not be burdensome, unjust or unreasonable.

"Abandonment of either of these roads would be a great public calamity, and if we could conceive of their being suddenly obliterated, their immediate reconstruction would follow in response to the public necessity, which shows that they must be worth what it would cost to reproduce them and that a return based on such cost will not be oppressive.''

Economy of Management.

''It has been urged before the Master with reference to the lines of railway under consideration that the evidence discloses want of economical management in that limited portions of the business were unremunerative and not infrequently resulted in loss.

''If the convenience and demands of the public were disregarded, greater economy could doubtless be exercised. Full cars and long trains at fewer intervals would be a great saving of cost, and to this end produce could be stored in elevators awaiting shipment under the most economical conditions. Needless to say that this would result in great public inconvenience and dissatisfaction, and recourse to such methods is unthinkable. The carrier must properly yield to public demand and recoup for loss on other portions of its business.

''It is also urged that as to some of the roads surplus lands and equipment are disclosed much beyond present needs. But it is good business sense to anticipate and prepare for the requirements of the near future. Readiness to serve is of the highest importance to those requiring service, and an efficient management will, if practicable, take advantage of the markets and buy what will soon be needed when it can be obtained at a reasonable price and not wait until it *must* be had regardless of cost. Present patrons are not to be burdened for the benefit of those to be acquired in the distant future, but they can well afford to pay a somewhat higher rate that they themselves in the near future may enjoy a cheaper and better service. It is proper for the carrier not only to provide itself with ample facilities for the efficient conduct of its present business, but also to anticipate demands soon to be made as the country becomes more prosperous, and it is entitled to revenue sufficient for such purpose.

''Having these considerations in mind, it does not appear that the service rendered or the property acquired and held for present and prospective needs are unreasonable or excessive or that any property has been improperly included as a basis of cost of reproduction for rate-making purposes.

DIVISION OF PROPERTY VALUATION BETWEEN FREIGHT AND PASSENGER BUSINESS, STATE AND INTERSTATE.

"A common use in general is made of the property devoted to the public service for both freight and passenger business, both state and interstate, respectively, and in making a statement with reference to each class so as to determine revenue with respect to cost, there must be a division of property valuation on some fair basis and an assignment to each of its proper proportion, so that each may carry its proper share of property expense.

"It is inequitable that the traveling public, largely on pleasure bent, should cast any part of the expense it incurs on the freight business, which has to do almost altogether with traffic in which the public as a whole is directly interested.

"On the other hand, it has never been claimed that the latter should be relieved at the expense of the former, and the cases all recognize the propriety of separation upon an equable basis as near as may be.

"Furthermore, to determine what net revenue is derived from intrastate business and the per cent of return upon property used in that class of business, it becomes necessary to make a subdivision of property values and determine what part thereof should be assigned to state and to interstate business, respectively. The revenues from each class of business within and properly assignable to the state are known and the amount thereof and the separation as between states accepted by both parties and are practically free from estimated approximations.

"Of course, any division of property value between the two classes of business, freight and passenger, must be an approximation, but one made on the relation of gross revenue derived from each kind of business has been uniformly accepted as the fairest, all things considered, in all rate cases heretofore judicially determined. While a division of property valuation on the relation of cost has been suggested by defendants, it was practically conceded to be as open to criticism as that made on the basis of revenue. Relative cost as hereafter found is at best a rough and unsatisfactory approximation, necessarily inaccurate, and should not be accepted as a divisional basis if it can be avoided. The revenue basis is not ideal, but it has an element of certainty possessed by no other and is not more objectionable in other respects."

* * * * * *

"The total value of the property of the Northern Pacific Company, used in the fiscal year ending June 30, 1908, in the conduct of its transportation business in Minnesota, was $90,204,545.

"Such total value may justly and fairly be apportioned between freight business and passenger business on the basis of gross earnings—that is, assign to each such percentage of total value as the amount of the gross earnings of each bears to the total gross earnings of both.

"Total gross earnings from freight business and passenger business, including miscellaneous earnings of each, was in said year $13,336,046.87.

"Gross earnings freight business, including miscellaneous (consisting of switching, demurrage, storage, etc.), $9,823,508.35, equals 73.661 *per cent of total.*

"Gross earnings passenger business, including miscellaneous (consisting of mail, express, excess baggage, etc.), $3,512,538.52, equals 26.339 *per cent of total.*

73.661 per cent of total value ($90,204,545) assigns $66,445,570 to the freight business, and 26.339 per cent of total value assigns $23,758,975 to the passenger business."

STATE AND INTERSTATE BUSINESS.

"*Freight.* The total freight earnings, including miscellaneous, in Minnesota for the fiscal year ending June 30, 1908, amounted to $9,823,508.35, of which $1,606,771.26, or 16.356 per cent thereof, was intrastate, and $8,216,737.09, or 83.644 per cent, was interstate.

"16,356 per cent of total value apportioned to freight business ($66,445,570) assigns $10,867,837 to the intrastate freight business, and 83.644 per cent of such total value apportioned to the freight business assigns $55,577,733 to the interstate freight business.

"*Passenger.* The total passenger earnings, including miscellaneous, in Minnesota for the fiscal year ending June 30, 1908, amounted to $3,512,538.52, of which $1,206,333.09, or 34.344 per cent thereof, was intrastate and $2,306,205.43, or 65.56 per cent thereof, was interstate.

"34.344 per cent of the total value apportioned to the passenger business ($23,758,975) assigns $8,159,782 to the intrastate passenger business, and 65.656 per cent of such total amount apportioned to the passenger business assigns $15,599,193 to the interstate passenger business.''

SUMMARY.

	Value Assigned	
Intrastate freight business—16.356% of 73.661 of total	$10,867,837 or	
Per cent of total		12.048
Intrastate passenger business—34.344% of 26.339 of total	8,159,782 or	
Per cent of total		9.046
Total to intrastate business	$19,027,619	
Interstate freight business—83.644% of 73.661% of total	$55,577,733 or	
Per cent of total		61.613
Interstate passenger business—65.656% of 26.339% of total	15,599,193 or	
Per cent of total		17.293
Total to interstate business	$71,176,926	
Total valuation	$90,204,545	

REASONABLE RETURN.

''Having made the foregoing distribution of property valuations, the question is, What return are the companies respectively entitled to receive thereon without legislative interference for the protection of the public?

''It has been found that a full and fair return, such as is derived from investments in like kinds of business and subject to like conditions, would not compel the public served to pay an unjust or burdensome rate. It follows, therefore, that such valuation is as much an element of rate-making and is entitled to the same consideration as are the operating expenses of the company. The theory that it is entitled to some return, the amount thereof to be adjusted by the legislature regardless of property values devoted to the public service, must be rejected. Any rate which will not produce a full and fair return is unreasonable, and is confiscatory to the extent that it comes short of producing such return, and is a taking of property from the carrier class and giving it to the persons served without compensation.

''What is a just return? One of the most fair-minded and intelligent witnesses before the Master, one who from his long official experience and efficient service had necessarily given the matter very careful consideration, was of the opinion that the carrier should be assured an average annual return of seven per cent on a fair valuation of its property. The Master concurs in this view. Having in mind the nature of the business, its fluctuations from year to year due to extremes of weather and varying crop conditions, the fact that operations can never be suspended, but in time of adversity as well as prosperity the carrier must be ready to serve or forfeit its property devoted to the public service, and that competition is ever present and increasing, it would seem that the return here suggested would be the minimum when compared with returns from other kinds of business not subject to such conditions. It must be remembered also that the public demands and is able and willing to pay for a service of the highest efficiency, requiring able and skillful management. The continued prosperity of the country depends upon it, and the returns from such undertakings should be sufficiently adequate to encourage the investment of ample capital for their successful prosecution.

"In *Wilcox* v. *Consolidated Gas Co.*, 212 U. S., 19, the question as to the reasonableness of the rates prescribed by the state of New York for the defendant company within the city of New York was before the court for its determination. After making some general observations as to what compensation public service corporations would, under varying conditions, be entitled to receive, the court uses the following language:

> In an investment in a gas company, such as complainant's, the risk is reduced almost to a minimum. It is a corporation, which in fact, as the court below remarks, monopolizes the gas service of the largest city in America, and is secure against competition under the circumstances in which it is placed, because it is a proposition almost unthinkable that the city of New York would, for purposes of making competition, permit the streets of the city to be again torn up in order to allow the mains of another company to be laid all through them to supply gas which the present company can adequately supply. And, so far as it is given us to look into the future, it seems as certain as anything of such a nature can be, that the demand for gas will increase, and, at the reduced price, increase to a considerable extent. An interest in such a business is as near a safe and secure investment as can be imagined with regard to any private manufacturing business, although it is recognized at the

same time that there is a possible element of risk, even in such a business. The court below regarded it as the most favorably situated gas business in America, and added that all gas business is inherently subject to many of the vicissitudes of manufacturing. Under the circumstances, the court held that a rate which would permit a return of six per cent would be enough to avoid the charge of confiscation, and for the reason that a return of such an amount was the return ordinarily sought and obtained on investments of that degree of safety in the city of New York.

Taking all facts into consideration, we concur with the court below on this question, and think complainant is entitled to six per cent on the fair value of its property devoted to public use.

"If a gas company under the conditions there disclosed, with an assured revenue beyond all reasonable probability of hazard, was entitled to six per cent net return on the value of its property devoted to public use, a finding that in these cases the companies are entitled to seven per cent net return on such valuation, after allowing for all necessary repairs and replacements, is certainly conservative and does no injustice to the public. Few businesses are so free from hazard as that of national banks, and the evidence discloses that the average results of their business for thirty-eight years ending with 1907 shows net annual earnings to capital and surplus of 8.58 per cent, and for the period from March 1, 1897, to June 30, 1907, of 9.84 per cent.

"The Master determines that under the conditions disclosed in these cases the companies are entitled to a net return of seven per cent upon the value of their property as herein found.

NET REVENUE FROM FREIGHT AND PASSENGER BUSINESS.

"It now becomes necessary to determine the net revenue derived from the passenger and freight business, respectively, within the state of Minnesota, and to do so we must ascertain the cost in each class. It has been hereinbefore determined what the gross revenue derived from each class of business and apportioned to the state is, and there is no substantial controversy as to the gross aggregate cost incurred in conducting both classes of business taken as a whole, nor as to the apportionment thereof to the state.

"Because of the fact that there is a common use of the property in conducting each class of business, it is impossible to apportion to each with any degree of accuracy its proper proportion of cost so that neither shall be unduly burdened, and as to this matter the parties are far apart, both as to results and as to methods in obtaining them, in both the Northern Pacific and Great Northern cases.

"In the two cases last above mentioned, the allocations of cost made by the companies respectively have been accepted by both parties. That is to say, each company has assigned to the passenger business all those items of cost directly incurred in conducting that class of business and not common to both classes, and has assigned to the freight business all those items of cost directly incurred in conducting that class of business and not common to both classes, which assignments are accepted by both parties, and the items thereof are called allocated items and cover about sixty per cent of all expenses. The remaining items of cost not so allocated and which are common to and are incurred in conducting both freight and passenger business, are not capable of separation and assignment to each class except upon some more or less arbitrary basis, and approximations only are attainable. Such items by both companies have, in general, been divided and assigned to passenger and to freight business, respectively, upon the relation, as to most of them, which the revenue train-miles in the one class of business bears to the revenue train-miles in the other class of business, and to the items not so divided, upon the relation which the revenue engine-miles in the one class bears to the revenue engine-miles in the other, and this division and assignment has been accepted by the complainants and they have offered much testimony in support thereof in these two cases.

"The method is the one now, and which for many years last past has been, in general use upon all the leading railroads of the country when any attempt at such division is made, constituting, in mileage at least, about one-third of all the lines of railway in the United States. A division of this character was at one time required by the Interstate Commerce Commission, and the foregoing method was the one prescribed for the purpose. Such requirement was subsequently withdrawn and such division of cost between freight and passenger seems to have been quite generally abandoned, but many companies, for their own use and information, continue to make such division according to this method, which would seem to have been the outgrowth of practical observation and experience in the exercise of an honest judgment. When it was originally adopted, there was no apparent reason, from interest or otherwise, for unduly burdening either class of business with more than its proper share of common expense. Its use is approved and supported by the evidence of a number of witnesses having an intimate knowledge and large experience in the practical operation of railway transportation in all its details.''

''It is conceded by all that there is practically no difference in cost arising from the fact that a transportation is across a state line and not wholly within the state, and there is no dispute but that a substantial difference exists in the cost of doing the short-haul and the long-haul business. This is clearly evidenced, in the freight business, by all rate tariffs, including the schedules of rates prescribed by the Commission's orders and the Commodity Rate Act which gave rise to these suits. The orders covering merchandise rates make the hauling charge for the first two hundred miles twice as large as for the second two hundred miles, and four times as large as for distances beyond the four hundred mile point, and a similar relation exists in the legislative commodity rates. There is, of course, some state traffic having a reasonably long haul and some interstate traffic having a short haul, but by far the greater volume of state business belongs to the more expensive short-haul class, and in the interstate business by far the greater part thereof belongs to the less expensive long-haul class. This is established by the fact that in the Northern Pacific case, for the year ending June 30, 1908, as the evidence shows, there were 960,709,494 ton-miles of interstate traffic touching Minnesota, with an average haul of 485.3 miles as against 130,580,988 ton-miles of state traffic with an average haul of only 104.52 miles.

''In view of these and all other conditions attending transportation, as disclosed by the evidence, entering into the question of relative expense, it becomes a difficult matter to determine with any degree of certainty the relation of cost per ton per mile in transporting state and interstate freight respectively, the expense of which is practically common to both and not subject to allocation. The complainants have produced as witnesses before the Master a very considerable number of able and competent operating men, intimately acquainted with and having a wide knowledge of all the details of railway transportation derived from long personal experience in conducting such business. Their testimony is to the effect that it costs from three to seven times as much per ton per mile to do the intrastate freight business as to do the interstate freight business, and that it costs from twenty-five to fifty per cent per passenger per mile more to do the state passenger business than to do the interstate passenger business. The defendants concede that there is greater cost attending the doing of state business, both passenger and freight, but insist that this increased cost is largely, if not wholly, taken up by the increased revenue per ton and per passenger per mile derived from the state traffic.

"The Master finds from the weight of testimony that the cost per ton-mile of doing state freight business is at least two and one-half times as much as is such cost in doing the interstate freight business in Minnesota, and that the testimony would amply sustain, if it does not compel, a finding that such relation of cost is as three to one. He also finds from the evidence that the cost per passenger mile in the state passenger business is at least fifteen per cent greater than such cost in the interstate business in Minnesota."

"The total gross earnings of the Northern Pacific Company from all sources involving any use of the property above valued within the state of Minnesota for the year ending June 30, 1908, was $13,682,983. Of this $9,823,508 was from freight and $3,512,538 from passenger service, or $13,336,046 from transportation.

Applying to these sums the proportion of valuations above allocated, the Master distributes the gross earnings as follows:

	Freight Earnings.	Per Cent.
Intrastate	$1,606,771.26	16.356
Interstate	8,216,737.09	83.644
Total	$9,823,508.35	100.00

	Passenger Earnings.	Per Cent.
Intrastate	$1,206,333.09	34.344
Interstate	2,306,205.43	65.656
Total	$3,512,538.52	100.00

To the sums thus assigned to freight and passenger service, state and interstate, was added $346,936 derived from "miscellaneous income net items" from the use of the property included in the foregoing valuation.

OPERATING EXPENSES.

Total operating expenses in Minnesota for said year	$7,655,350
Total taxes	596,119
Total	$8,251,469

Total net income derived from use of Minnesota property included in valuation—gross earnings from all such sources $13,682,983—less operating expenses and taxes $8,251,469, leaves $5,431,514, which equals 6.021 per cent return on value.

Of the total operating expenses there was expended in the conduct of the freight business, $5,343,718; and in the conduct of the passenger business, $2,311,632; total, $7,655,350.

Under the finding that it cost the company at least two and one-half times as much on the average to produce a ton mile in intrastate business as in the interstate business, the Master divided the total freight operating expenses as follows:

Intrastate	$1,355,247	or	25.362%
Interstate	3,988,444	or	74.638%
Total	$5,343,718	or	100.00 %

And under the finding that it cost the company 1.15 times as much to produce an intrastate passenger mile as an interstate passenger mile in Minnesota, he divided the total passenger operating expenses as follows:

Intrastate	$ 863,325	or	37.347%
Interstate	1,448,307	or	62.653%
Total	$2,311,632	or	100.00 %

Taxes and "other income" were apportioned between freight and passenger, state and interstate, on the gross earnings basis.

NET INCOME APPLICABLE TO VALUATION, APPORTIONED TO VARIOUS CLASSES OF BUSINESS.

"If from such total receipts so assigned to each class of intrastate business as hereinbefore stated, there be deducted the sum of the operating expenses and taxes so assigned to each such class of intrastate business, we have the following results:

"Intrastate net freight income $210,905.11 yields sufficient for an annual return on $10,867.837 of only 1.941 per cent.

"NOTE.—The losses which would have resulted from the application of the commodity rates enjoined have not been deducted. It is estimated that the intrastate freight earnings in Minnesota would have been reduced in said year by the application of such rates $21,493.67, which would effect a reduction in the rate return last mentioned.

"Intrastate net passenger income $342,663.75 sufficient to yield an annual return upon $8,159,782 of only 4.2 per cent.

"Total intrastate (freight and passenger) income, $553,568.86, sufficient to yield an annual return on $19,027,619 (total valuation assigned to all intrastate business) of only 2.909 per cent."

"If it be considered that operating expenses more correctly measure the use of the property than earnings, the division would be as follows:

INTRA FREIGHT.

Intra freight operating expenses........	$ 1,355,273.82=	17.7 %
All operating expenses.................	7,655,350.20=	100 %
17.7% of $90,204,545 valuation equals...	16,166,204	
Intra income—freight	210,905.11	
Annual return		1.304%

INTRA PASSENGER.

Intra passenger operating expenses......$	863,325.18=	11.28 %
All operating expenses................	7,655,350.20=	100 %
11.26% of $90,204,545 valuation equals..	10,175,073.00	
Intra income—passenger	342,663.75	
Annual return		3.368%

A like thorough analysis and assignment was made of the earnings, operating expenses and net revenues in Minnesota in the cases of the Great Northern and Minneapolis & St. Louis companies.

CONCLUSION.

"It appears from the foregoing facts, and the Master finds that for the two years next prior to July 1, 1908, in these three cases the revenue derived by the said defendant railway companies and each of them from the property thereof devoted to the public use in the operation of their respective lines of railway and the conduct of their business as common carriers of passenger and freight within and local to the state of Minnesota, were and that they still are inadequate and insufficient compensation for the property so used and the service rendered, and that the aforesaid rates prescribed by the orders of the Railroad & Warehouse Commission and the acts of the legislature were and still are unreasonably low, unjust and confiscatory, and, in the immediate future and until there shall be very material changes in existing conditions not likely soon to occur, they will continue so to be, and that the enforcement of said orders and acts should be enjoined and restrained, as well because they are unreasonably low and confiscatory as because they constitute a burden upon and interference with and a regulation of interstate commerce, as has been hereinbefore found and determined."

In concluding the Master said: "The foregoing findings of fact and conclusions of law the Master deems sufficient to cover all the issues necessary for final judgment in these three cases. It is needless to say that they have been thoroughly and carefully tried and with marked ability on behalf of both parties, and nothing has been left undone to fully apprise the court of every fact necessary to reach a just decision, and to this end counsel on both sides have given their undivided attention in the presentation of testimony and preparation of briefs, and in oral argument, for a period of nearly two and a half years' time as the Master believes well spent in the ultimate determination of questions of great national as well as of great commercial importance."

CHAS. E. OTIS,
Special Master.

September 21, 1910.

THE MINNESOTA RATE CASE

JUDGE SANBORN'S OPINION.

In the United States Circuit Court, District of Minnesota, Third Division.

After a brief statement of the nature of the case at issue, Judge Sanborn said:

"The cases were referred to Hon. Charles E. Otis as Special Master to hear and report the evidence to find the facts and to recommend forms of decrees. He has made a clear, concise and exhaustive finding of the facts, has returned all the evidence to the court, and has recommended decrees for the complainants on both of the grounds they presented. Exceptions to his report have been argued, and the cases are here for decrees. In the discussion of the questions at issue the term 'defendants' will be used to designate the Attorney General and the Members of the Railroad and Warehouse Commission, because they alone actively assail the findings and recommendation of the Master.

"The first question for consideration is whether or not the orders of the Commission and the acts of the Legislature substantially burden interstate commerce, and the answer to this question must be drawn from an application of the facts which disclose their effect to the established rules of law which govern this subject.

"These orders and acts by their terms relate to intrastate fares and rates only. Counsel for the defendants insist that in the police power of the state is vested plenary authority to make and enforce them because they relate to commerce within the state only, while the complainants argue that their enforcement is beyond the power of the state because the effect of their necessary operation is substantially to burden interstate commerce and hence to invade the exclusive domain of the nation, in violation of the commercial clause of the Constitution (Article 1, Section 8).

"The principles and rules of law by which these orders and acts must be tried have been conclusively established by the decisions of the Supreme Court, and it will not be unprofitable to state them here again and to bear them constantly in mind during the consideration of the facts which must determine the issue here presented.

"The power to regulate commerce among the states was carved out of the general sovereign power by the people when the national government was formed, and granted by the Constitution to the Congress of the nation. That grant is exclusive. The United States may exercise that power to its utmost extent, may use all means requisite to its complete exercise, and no state, by virtue of any power it possesses, either under the name of the police power or under any other name, may lawfully restrict or infringe this grant, or the plenary exercise of this power; for these are paramount to all the power of the state and inhere in the supreme law of the land. The fares and rates of transportation of passengers and freight in interstate commerce are national in their character and susceptible of regulation by uniform rules. The silence or inaction of Congress relative to such a subject is a conclusive indication that it intends that the interstate commerce therein shall be free, so far as the Congress has not directly regulated it.*

"To the extent necessary completely and effectually to protect the freedom of and to regulate interstate commerce the nation by its Congress and its courts may affect and regulate intrastate commerce, but no farther.

"To the extent that it does not substantially burden or regulate interstate commerce a state may regulate the intrastate commerce within its borders, but no farther.

"If the plenary power of the nation to protect the freedom of and to regulate interstate commerce and the attempted exercise by a state of its power to regulate intrastate commerce, or the attempted exercise of any of its other powers, impinge or conflict, the former must prevail and the latter must give way, because the Constitution and the acts of Congress in pursuance thereof are the supreme law of the land, and 'that which is not supreme must yield to that which is supreme.'

"Thus a part of every interstate transportation is carried on within the state of its initiation and concluded within another state, but neither state may fix or regulate the fares or rates of the part within its borders, because the authority so to do is requisite to the complete preservation of the freedom of, and to the untrammeled regulation of that transportation, and this power is vested exclusively in the nation.

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*Cases cited here and elsewhere throughout the opinion in support and illustration of its views are omitted, as this condensation is not for professional use.

''The nation and many states provide that carriers may not charge a higher rate for a short haul than for a long haul of like articles in the same direction under similar circumstances. But where the long haul is interstate, although the short haul is entirely within a single state, such a state may not enforce such a law for the same reason.

''A state has the general power to prescribe the terms under which foreign corporations may carry on business within it, but any attempted exercise of that power by statute or otherwise in such a way as to prohibit or substantially to burden the interstate commerce of a foreign corporation within its borders is unconstitutional and void.

''Subject to the constitutional limitation, which has been stated, a state may enact and enforce laws prescribing reasonable fares and rates for and otherwise regulating its intrastate commerce, although the operation of such laws remotely or incidentally affects interstate commerce.

''On the other hand, the laws of a state or the orders of its commissions relating to its intrastate commerce which by their necessary or natural or probable operation have the effect substantially to burden interstate commerce are beyond its powers, violative of the commercial clause of the Constitution, and void. Of this character are statutes imposing burdensome conditions on the landing of passengers from vessels employed in foreign commerce, etc.

''The acts of the legislature of Minnesota and the orders of its commission are so general and so far reaching in their effect that there is no doubt that they unavoidably affect the interstate commerce of the companies. In the light of the rules and decisions reviewed, the question here at issue therefore becomes: Do these statutes and orders substantially burden or only incidentally or remotely affect the interstate commerce of the companies? This question, however, may not be answered by the words or terms of the laws and orders, or by a consideration of the intent or purpose of their makers alone. The touchstone to the true answer to the question and the test of the validity of the orders and statutes is their effect upon interstate commerce.

"It is the effect, and not the terms or purpose, of state regulations of its local commerce, that determines whether or not they so substantially burden interstate commerce that they violate the commercial clause of the Constitution. And this is a judicial question which each court must determine on its own responsibility on the special facts of each particular case, and in the determination and decision of which it 'must obey the Constitution rather than the lawmaking department of the government.'

"The counter proposition again presented in this case, that it is only where orders and statutes by their terms or by their construction by state courts substantially or directly regulate interstate commerce, or where by their terms they disclose an intent of their makers so to do that they may be adjudged violative of the commercial clause, has been repeatedly urged upon the consideration of the Supreme Court in the cases just cited, and in many others only to be conclusively denied. In *Galveston, Harrisburg, etc., Ry. Co.* v. *Texas,* 210 U. S. 217, 227, a case which involved a statute levying a tax upon a road entirely within the state which the court held to be a substantial burden upon interstate commerce and void, it said:

> Neither the state courts, nor the Legislatures, by giving the tax a particular name, or by the use of some form of words, can take away our duty to consider its nature and effect. If it bears upon commerce among the states so directly as to amount to a regulation in a relatively immediate way, it will not be saved by name or form.

"Only last year in the Kansas cases (216 U. S. 1, 56) the Supreme Court again repudiated this contention. In those cases a statute of Kansas required of foreign corporations certain fees as a condition of permitting them to conduct intrastate business in that state. The Western Union Telegraph Company, which was carrying on both intrastate and interstate business in Kansas, applied for permission to continue its intrastate business, and the charter board of the state ordered that its application be granted only on condition that it pay the fee prescribed by the statute, and 'that nothing herein contained shall apply to nor be construed as restricting in any wise the transaction by the said applicant of its interstate business, nor its business for the federal government, but that this grant of authority and requirement as to payment relates only to the business transacted wholly within the state of Kansas.' The officers of the state insisted that this statute and this order were valid because by their express terms they excluded interstate business, applied to intrastate business alone, and disclosed a clear purpose and intent of the legislature and the board not to obstruct or embarrass interstate commerce in any way. But the Supreme Court reviewed several of its earlier decisions upon this subject, held the statute and the order unconstitutional, and, among other things, said:

> But the disavowal by the state of any purpose to burden interstate commerce cannot conclude the question as to the fact of such burden being imposed, or as to the unconstitutionality of the statute as shown by its necessary operation upon interstate commerce. If the statute, reasonably interpreted, either directly or by its necessary operation burdens interstate commerce, it must be adjudged to be invalid, whatever may have been the purpose for which it was enacted, and although the company may do both interstate and local business. This court has repeatedly adjudged that in all such matters the judiciary will not regard mere forms, but will look through forms to the substance of things. 216 U. S. 1, 27.

"And Mr. Justice White in the Pullman Company's case, 216 U. S., at page 65, which involved the same statute, said that one of the propositions conclusively established by previous decisions of the court was that:

> Even though a power exerted by a state, when inherently considered, may not in and of itself abstractly impose a direct burden on interstate commerce, nevertheless such exertion will be a direct burden on such commerce if the power as exercised operates a discrimination against that commerce, or what is equivalent thereto, discriminates against the right to carry it on.

"And Mr. Justice Harlan in *Ludwig* v. *Western Union Telegraph Co.,* 216 U. S., at page 162, discussing a similar statute of Arkansas, said:

> According to well-settled rules of statutory construction, the validity of a statute, whatever its language, must be determined by its effect or operation, as manifested by the natural and reasonable meaning of the words employed. Henderson v. Mayor of New York, 92 U. S. 259, 268. If a statute by its necessary operation really and substantially burdens the interstate business of a foreign corporation seeking to do business in a state, or imposes a tax on its property outside of such state, then it is unconstitutional and void, although the state Legislature may not have intended to enact an invalid statute.

"Here, then, is the decisive question upon this branch of these cases. Is the effect of the statutes and orders assailed substantially to burden the interstate commerce of the companies? And we turn to the facts of this case for the answer."

Here Judge Sanborn adopts or paraphrases the findings of fact by the Master, and then continues:

"The facts which have been recited were found by the Master, and the foregoing statement of them is, with rare exceptions, in his clear and concise language. Many exceptions are leveled at these findings, but they are sustained by clear and convincing evidence, and the only question remaining here is: Do they justify the conclusion that the effect of the acts and orders prescribing the Minnesota maximum fares and rates is to impose a substantial burden upon or to regulate or to discriminate against interstate commerce, or to create unjust discrimination between interstate localities? Counsel for the defendants insist that this question should be answered in the negative.

"They argue that the prescription and enforcement of these fares and rates cannot constitute an unconstitutional burden upon or interference with interstate commerce because the orders and acts relate to commerce within the state only and the state has power to regulate its purely local commerce. This contention, however, cannot be sustained because, as has been demonstrated in the earlier part of this opinion, if, by their natural or necessary operation, these acts and orders have the effect substantially to burden interstate commerce, they fall under the ban of the Constitution and beyond the power of the state whatever their terms or the intent of their makers may have been.

"They say that, while the reduction of the local fares and rates may induce the companies to reduce their interstate rates and fares across the borders of the state to a parity with the local rates, this is the voluntary act of the companies not directly required by the laws and orders. There are, however, known and inexorable laws of commerce, and one of them is that transported articles will move at the lowest available rates. Reduce local fares and rates so that fares and rates in interstate commerce across the borders of the state are substantially higher than the sums of the locals over the Minnesota stations on or near the state boundaries, and the companies must reduce their interstate fares and rates on that portion of their interstate commerce affected by the sums of the locals over the Minnesota borders to a substantial parity with the sums of the locals, or their interstate commerce affected thereby will unavoidably become intrastate commerce, and move at the sums of the locals. There is nothing voluntary on the part of the companies in the loss or burden imposed upon them by these reductions. That they must suffer whether they reduce their interstate rates or maintain them and permit the transformation of their affected interstate commerce into intrastate commerce by rebilling and local contracts so that it can pass at the sums of the locals. The loss of the difference in revenue between that derived from their former interstate rates and that derived from the sums of the locals is a direct and unavoidable burden upon their interstate commerce imposed by the acts and orders stated which the companies may not by any device avoid.

"Moreover, the acts and orders making these intrastate reductions necessarily operate to discriminate against interstate commerce and the right of the companies to carry it on, and in that way constitute a direct burden upon such commerce. Mr. Justice White said, in the Pullman Company's case, 216 U. S., at page 65, that, though a power exerted by a state may not abstractly impose a direct burden on interstate commerce, yet such exertion will be a direct burden upon such commerce if the power as exercised operates a discrimination against that commerce, or, what is equivalent thereto, discriminates against the right to carry it on. If the companies exercised their right to maintain, and did maintain, their former interstate rates upon that portion of their interstate commerce affected by the local Minnesota rates, they lost to local commerce that interstate commerce, because it passed by rebilling and local contracts at the sums of the locals. This necessary effect of the local maximum rates was a direct discrimination against interstate commerce and the right to conduct it, and hence a direct burden upon that commerce. If, on the other hand, to avoid this discrimination the companies reduced their rates, that reduction was a like direct burden, and no course was open to them whereby they could exercise their constitutional right to conduct their interstate commerce free from the direct regulation thereof effected by these acts and orders.

"Another vicious and inevitable effect of these acts and orders is the unjust discrimination in fares and rates between localities in Minnesota and those beyond its borders which they affect. Moorhead, Minn., and Fargo, N. D., are practically the same distance from St. Paul, Minneapolis and Duluth, respectively. They have long received, and they ought to continue to receive, the same fares and rates in and out. This is also true of Duluth, Minn., and Superior, Wis.; Breckenridge, Minn., and Wahpeton, N. D.; East Grand Forks, Minn., and Grand Forks, N. D. These acts and orders reduced the fares to and from the Minnesota towns of these pairs from and to other Minnesota points 33 1/3 per cent, and the freight rates from 7 per cent to 25 per cent, while the former interstate fares and rates from and to the other towns of the pairs remained in effect, as to commodity rates under the protection of the injunction of this court, and would have continued in effect in the matter of merchandise rates and the passenger fares, had not the prohibition of discriminations between localities by the interstate commerce law and the laws of trade which have been considered compelled the companies to reduce their interstate rates to a parity with the local rates prescribed. The discrimination thus wrought by these acts and orders between the towns mentioned on the state lines is but illustrative of the undue preference and advantage the local reductions gave to Minnesota cities and towns, and the unreasonable prejudice and disadvantage to which they subjected the towns and the cities of other states similarly situated in their vicinity.

''Congress, by the 'act to regulate commerce' (24 Stat., 379), forbade the companies to make or give any undue or unreasonable preference or advantage to any party or locality, or to subject any party or locality to any unreasonable prejudice or disadvantage in any respect whatsoever, and the prevention of the discrimination thus prohibited was one of the main purposes of this legislation. The first section of the act, however, contained this provision:

> Provided, however, that the provisions of this act shall not apply to transportation of passengers or property, or to the receiving, storage or handling of property wholly within one state, and not shipped to or from a foreign country from or to any state or territory aforesaid.

''The result was that the act of Congress forbade, and the acts and orders of the officers of Minnesota compelled, this discrimination between localities under the penalty of the surrender by the companies of a substantial part of their interstate commerce or of the revenue therefrom. Counsel for the defendants argue, however, that this radical discrimination is not forbidden by the interstate commerce law because it is a discrimination wrought, not by an undue difference between intrastate rates of which they say the state has exclusive jurisdiction, nor by an undue difference between interstate rates of which they admit the nation has exclusive jurisdiction, but by an undue difference between intrastate rates and interstate rates, and they contend that over the discrimination thus wrought neither state nor nation has any power. The argument, however, again disregards the broad and fundamental difference between the power of the state over intrastate commerce and the power of the nation over interstate commerce. The state may regulate its intrastate commerce so far only as the exercise of its power does not substantially burden or regulate or discriminate against interstate commerce, but no farther. A state may not prohibit or regulate discrimination between interstate and intrastate rates in such a way as substantially to burden or regulate interstate commerce, as, for instance, by the prohibition of a higher charge or rate for a short haul wholly within the state than for a long haul that includes the short haul and extends into another state, because such action burdens and regulates interstate commerce. By the same mark, because it is a direct regulation of interstate commerce, the nation may regulate and prohibit discriminations wrought by an undue difference between interstate and intrastate rates, although such regulation or prohibition may also to some extent affect and regulate intrastate commerce.

"'This power,' said Chief Justice Marshall, 'like all others vested in Congress, is complete in itself, may be exercised to its utmost extent, and acknowledges no limitations, other than are prescribed in the Constitution. * * * If, as has always been understood, the sovereignty of Congress, though limited to specified objects, is plenary as to those objects, the power over commerce with foreign nations, and among the several states, is vested in Congress as absolutely as it would be in a single government having in its Constitution the same restrictions on the exercise of the power as are found in the Constitution of the United States.' The power therefore to prohibit the railroad companies from making or permitting any undue discrimination between localities and parties by unreasonable differences between intrastate and interstate rates was vested in Congress, and no acts or orders of the state or its officers could justify such a discrimination. If, as the Supreme Court held in the Eubank case, a state has no authority to suppress such a discrimination, much less has it the power to create and maintain it.

"But counsel insist that, if Congress had the power to forbid this discrimination, it did not exercise it because it declared in the proviso to Section 1 that the provisions of the interstate commerce act should not apply to transportation wholly within one state. But the main object of the act was to prevent every undue discrimination between parties and between localities. When it was enacted there was a crying evil in such discriminations, an insistent public demand for the remedy thereof, and a determined effort by the legislators to make the prohibitions of such discriminations as broad, searching and effective as the Congress had the power to make them. It had, as we have seen, ample authority to forbid discriminations wrought by differences between intrastate and interstate rates, but none to prohibit discriminations caused by differences in rates for transportations wholly within a state. The act prohibits any undue discrimination in any respect whatever between localities under similar circumstances and conditions by any common carrier subject to its provisions. In the light of these facts the natural and reasonable construction of the proviso in Section 1 is that it was inserted out of abundance of caution to make sure that the broad terms of the act did not go beyond the constitutional power of the Congress and directly regulate intrastate commerce more than was necessary completely to regulate interstate commerce, and that it has no farther effect upon the subject of discrimination now under discussion. The evil the act was passed to remedy, the main purposes of its passage, the public demand for a prevention of all discriminations, the patent effort of the legislators to meet this demand, and the broad terms of the prohibitions themselves compel the conclusion that the Congress intended to exercise, and that by this act it did exercise, its constitutional power to prevent discriminations of the character here in question to its utmost extent, and that the companies were and are prohibited thereby from making or maintaining the unjust discriminations between localities which the maintenance of their former lawful interstate fares and rates and the intrastate rates prescribed by the acts and orders of the officers of the state would necessarily effect.

"The next suggestion is that, if the prohibition of the interstate commerce act applies to discriminations between intrastate and interstate rates, it applies only when the transportation is under substantially similar circumstances and conditions and the acts and orders in question render the circumstances and conditions under which the intrastate rates are charged dissimilar from those which condition the interstate rates. But state laws and orders effecting discriminations forbidden by acts of Congress cannot be held by themselves to create such dissimilar conditions as to warrant the maintenance of such discriminations.

Finally, counsel cite, to overcome the proof of the substantial burden and the direct regulation of interstate commerce affected by the acts and orders in this case, with which this record teems, these words from the opinion of Mr. Justice Brewer in *Ames* v. *Union Pacific Ry. Co.* (C. C.), 64 Fed., 172:

> Neither can I understand how the reduction of local rates, as a matter of law, interferes with interstate rates. It is true that the companies may, for their own convenience, to secure business, or for any other reason, rearrange their interstate rates and make them conform to the local rates prescribed by the statute; but surely there is no legal compulsion. The statute of the state does not work a change in interstate rates, any more than an act of Congress prescribing interstate rates would legally work a change in local rates. Railroads cannot plead their own convenience, or the effect of competition between themselves and other companies, in restraint of the otherwise undeniable power of the state.

"The reduction of local rates does not interfere with interstate rates, 'as a matter of law,' yet it may do so as a matter of fact. Whether or not the general and sweeping reductions, in local rates in Minnesota necessarily interfere with interstate rates and interstate commerce is in this case, as it must be in every case, a question of fact. The facts which determine that question in this case have been set forth in this opinion at great length, because it is upon them, and not upon legal inferences, that the answer to the question, whether or not the effect of the necessary operation of the acts and orders challenged is substantially to burden interstate commerce, now rests. Those facts are that it was not for 'their own convenience,' but at great inconvenience and loss, not on account of the 'effect of competition between themselves and other companies,' but because these acts and orders, the prohibition of discrimination between localities by the interstate commerce act and the laws of trade forced them to do so, that the defendants reduced their interstate commerce rates to a parity with the local rates and submitted to the loss of interstate revenue this action entailed. The opinion of Mr. Justice Brewer in the Ames case is inapplicable to the cases in hand, because no such array of condemnatory facts was ever submitted to him in that case, and *it is perhaps not too much to say that no case has been* *found in the books in which any such proof of the unavoidable effect of general reductions of intrastate rates to substantially burden and directly regulate interstate commerce has ever been presented.*

''Minnesota, North Dakota, South Dakota and Wisconsin embrace a vast region, 1,000 miles in extent, traversed by the railroads of the defendant companies, which produces the same things shipped to the same markets, and consumes the same things bought in the same markets. The conditions of the transportation of passengers and freight in interstate traffic and also in intrastate traffic have been, and are, identical, and a relative, fair and equable relation between fares and rates in interstate commerce and fares and rates in intrastate commerce had been maintained before the acts and orders here challenged were made. The railroad companies had established and were collecting their interstate fares and rates pursuant to the act to regulate commerce enacted by the Congress of the United States. Those fares and rates were lawful, hence presumptively reasonable, and neither the officers of the state of Minnesota nor any court, state or federal, could legally adjudge them unreasonable until they had been denounced by the Interstate Commerce Commission. The fares and rates and the traffic in intrastate commerce were so inextricably interwoven with the fares and rates and the traffic in interstate commerce that a general and substantial reduction of the fares and rates in either by its necessary operation compelled a similar reduction in the other, because the interstate commerce act forbids the discrimination that would otherwise result and because traffic will move only at the lowest available rates. The subject of the fares and rates in interstate commerce through this region is national in its character and capable of regulation by uniform rates, and the railroad companies are therefore free to make and regulate them, subject only to the orders of the Interstate Commerce Commission. The officers of the state of Minnesota, by the acts and orders challenged made a general and sweeping reduction of 33 1/3 per cent in passenger rates within that state, of 20 per cent to 25 per cent in rates on general merchandise, of 7.37 per cent on grain, coal, live stock and lumber, and of 13.58 per cent on in-rates to distributing points.

''The effect of the necessary operation of these acts and orders was substantially to burden and directly to regulate the interstate commerce of the companies by causing the transformation of that part of their transportation upon which their former interstate rates were higher than the sums of the locals over the border towns in Minnesota into local commerce at those sums, or by causing the companies to reduce their interstate fares and rates affected by the reduced local fares and rates to a parity therewith. This effect was unavoidable because the interstate commerce law prohibited the companies from giving to Minnesota towns and cities the undue and unreasonable advantage and from subjecting the cities and towns of other states in the vicinity to the undue and unreasonable disadvantages which a maintenance of their former interstate fares and rates and the prescribed local fares and rates would have wrought, and because passengers and freight will move at the lowest available rates.

"This effect was not like that of the directions concerning the movements of particular trains, the inspection of animals to guard against disease, the reduction of intrastate rates on one or a few compelling, may they escape the ban of the Constitution? If one articles of commerce, and similar regulations which were sustained in the cases in the earlier part of this opinion and in others of like character, because their effect upon interstate commerce was so incidental and remote as to be negligible. The effect of these acts and orders was substantial, direct, controlling and compelling. They are general and sweeping in their terms, they reduce the fares and rates on the great body of intrastate commerce in the state of Minnesota from 7 to 33 1/3 per cent, and their inevitable effect is directly and unavoidably to regulate much of the interstate commerce of the defendant companies and unavoidably to cause each of them great loss of revenue therefrom.

"No case has been found in the books in which the facts disclose a more substantial burden imposed upon interstate commerce by the acts or orders of the officers of any state than that which the effect of the necessary operation of these acts and orders entails upon the interstate commerce of these companies. If, in the early proceedings in the Northern Pacific case, the Supreme Court was moved to say of the issue whether the necessary effect of these acts and orders was to interfere with and to regulate interstate commerce, 'the question is not, at any rate, frivolous,' how, now, that their necessary effect upon that commerce has been indisputably proved to be not only general and substantial, but controlling and state might by such radical reductions of its local fares and rates below legal interstate fares and rates constitutionally use the laws of trade and the prohibition of discriminations in the interstate commerce law to force like reductions of interstate rates, all states might do so, and the power of the states to regulate fares and rates in interstate commerce would be supreme and that of Congress and the Interstate Commerce Commission inferior and futile. Such does not seem to be the law.

"Each of the acts and orders challenged has the natural and necessary effect substantially to burden and directly to regulate interstate commerce, to create undue and unjust discriminations between localities in Minnesota and those in adjoining states, and it is unconstitutional and void."

Judge Sanborn then takes up the discussion of whether the maximum state rates prescribed were sufficient to pay the cost of earning them taxes and just returns upon the real values of the Minnesota properties. Here again he sustains the methods of the Master and declares "His findings upon all these matters are terse, clear and complete." The judge then proceeds:

"Exceptions to them and to the report have been taken, and counsel for the defendants by brief and argument seem to have presented every contention and suggestion in opposition to them that learning, ingenuity, and ability enable man to conceive.

"Fortunately it is unnecessary to enter upon any review of the authorities, or any discussion of the rules of law, by which the validity, under the fourteenth amendment to the Constitution of the United States, of the acts and orders which prescribed the fares and rates in question must be tried. They are presumed to be reasonable and valid because the Legislature and the Commission have the power to prescribe fares and rates of this nature on condition that they do not have the effect to deprive the owners of any property whose use is subjected to them, and the legal presumption is that the officers of the state have faithfully discharged their duties and acted within the constitutional limits of their power. Proof that they have not done so or that their acts and orders are violative of the federal Constitution must be clear.

"It is, however, beyond the power of a state or of its officers to establish or maintain fares and rates the effect of the enforcement of which is equivalent to the taking of the property of public service corporations for public use without compensation, unless justice to the public requires such a confiscation. Fares and rates must be just, both to the people and to the carrier. In the case in hand justice to the people does not demand that the property of the defendant companies shall be taken for their benefit without just compensation, and fares and rates which do not yield a reasonable return upon the real value of the property of the railroad companies subjected to them are confiscatory in their nature, and the acts and orders which establish or maintain them are unconstitutional and void. 'What the company is entitled to demand, in order that it may have just compensation, is a fair return upon the reasonable value of the property at the time it is being used for the public.' "

Regarding the contention of counsel that the presumption was that fares and rates fixed by the Legislature and the Commission were just and reasonable, and that the findings of the Master were insufficient to overcome that presumption and must be presumed to be wrong, Judge Sanborn said:

"This contention is urged with such force and frequent repetition in brief and argument, and is applied so persistently to the various specific findings of the Master, that it deserves consideration.

"Rate making, the determination of what shall be the railroad rates in the future, is a legislative function. But rate judging, the determination whether rates already made yield a fair return upon the reasonable value of the property used to earn them, or take that property without just compensation in violation of the Constitution, is a judicial function. Why should the presumption that the judicial officer, on whom the duty to perform the latter function is imposed by the law, rightly discharges that duty and reaches just conclusions, be less persuasive than the presumption that legislative officers faithfully discharge theirs? When a rate is made under legislative authority, the legal presumption is that it is fair and reasonable, and proof to the contrary must be clear, especially in cases in which the rates challenged have never been in operation and injunctions are sought while their effect is yet speculative.

"But the question whether fares and rates which have been put in operation confiscate the property of the companies in violation of the Constitution of the United States is a judicial, and not a legislative, question. And when that issue is presented the rules of law, of equity and of practice applicable to the determination of judicial questions have effect. When, therefore, rates have been tried by actual use for many months, and their effect has become known and is proved, when the issue whether or not they take the property of the railroad company without just compensation has been made in a competent court, and all parties have introduced, in the presence and subject to the cross-examination and rebuttal of each other, all the evidence they desire, when that issue and the numerous subordinate issues it involves have been heard and decided, as they have been in the case in hand, by a Master, who has personally heard the testimony of every witness, received and examined all the evidence, and made specific findings of every material issue of fact in the case, the judicial presumption arises that his findings are right. This is a presumption of reason as well as of law, a presumption that forces itself upon and compels the reflective mind. Take the general issue. The Legislature and the Commission decided it upon the information they had acquired as to the probable effect of the rates they were making before those rates were tried. The Master decided it after the fares and all the rates, except the commodity rates, had been tried for many months and their actual effect was known and proved. The former decision was based on the conjectural effect of the rates, the latter on their actual effect. The Master decided this issue upon a full trial, in which all parties produced all their evidence, subject to the cross-examination and rebuttal of each of the other parties, in the manner which the wisdom and experience of centuries has taught is most conducive to the discovery of the truth and the administration of justice. The Legislature and the Commission decided it without such trial or such proof.

"Doubtless if the fares and rates had been tested by the actual operation of the railroads under them, and the plenary proof of their effect and of the other facts presented to the Master had been introduced before the Legislature and the Commission, they would have reached the same conclusions which the evidence forced upon the Master's mind. They decided the issue upon evidence more conjectural or speculative; he, upon proof more certain and conclusive. And the presumption that a Master learned in the law, accustomed by long experience at the bar and on the bench to hear and analyze evidence and draw just conclusions therefrom, has faithfully discharged his judicial duty and reached right results, is not less strong that the presumption that the Legislature and the Commission rightly discharged their official duties. The result is that when, after fares and rates have been in effect for months, plenary proof of that effect and of other facts pertinent to the issue of confiscation vel non is made before a Master, who finds the facts, the legal or judicial presumption that his findings are just and right, while not conclusive, is superior to the original presumption that they were just and reasonable, which arose before they were or could be tried, and it prevails over it. The question, therefore, upon the exceptions to the Master's report, is not, is there any evidence upon which one might fairly, in the exercise of an honest judgment, reverse his fiindings? But it is, are the findings which are presumptively right sustained by clear proof? If they are, they should be affirmed, and the exceptions to them should be overruled.

"Many other exceptions were taken to items which constitute parts of the values found by the Master. Each one of them has been examined in the light of the evidence, the arguments, and the briefs. They challenge matters less important than those that have been reviewed, and no good purpose would be served by stating and discussing them in detail. Suffice it to say that none of these exceptions is sustained by the record, and the result is that the findings of the values of the Minnesota properties of the three companies by the Master must be confirmed.

"Complaint is made that the Master finds that the companies are entitled to a net return of 7 per cent per annum upon the respective values of their properties devoted to this public use. The character of the business in which an investment is made, the locality in which it is placed, the returns secured in that locality from other investments of a similar nature, the uniformity and certainty of the return, and the risks to which the principal and the income from it are subjected condition the measure of a fair return upon capital invested. An investment in a bank, in a factory, in a mercantile, manufacturing or agricultural business, is substantially free from regulation by the government and exempt from any duty to the public, except that of paying taxes. If the business in which such an investment is made is unprofitable, its owners may promptly discontinue its operation until more prosperous days come and then return to their undertaking. An investment in a railroad which operates in many states is subject to the regulation of its business by many governments. Its owners owe the duty to the governments and to the public to operate their railroad continually in days when its operation is unprofitable as well as when it is remunerative, a duty they must discharge under the penalty of forfeiture of their property if they fail. In view of these facts, they ought to be permitted to receive a return large enough to enable them to accumulate in prosperous days a surplus sufficient to enable them to protect their property in days of disaster and to make their average return through days of prosperity and of adversity fair and just. The lands in Minnesota through which these railroads extend are fertile and productive. The cities, villages and towns they reach are rapidly increasing in population and wealth, and the people they serve are thriving and successful. *The evidence satisfies that the railroads are maintained in excellent condition, that they are efficiently and on the whole economically managed and operated, and are rendering commendable service.* Justice to the thriving people they serve does not require that the owners of these railroad properties should be deprived of a fair return upon their values. To deprive them of such a return would prevent advances and tend to compel reductions in the wages and salaries of their employes, would tend to prevent the extension of their lines into portions of the state where the development and accommodation that railroad service assures would be welcome and may be needed, to deteriorate the character of the service they render, and to retard the general prosperity. The legal rate of interest on a debt in Minnesota, in the absence of contract, is 6 per cent, and by contract it may be 10 per cent per annum. Rational investments in agricultural, manufacturing, mercantile and other industrial pursuits, and even well-secured loans, yield returns in Minnesota corresponding with these lawful rates. Investments in railroads and the returns thereon are at the risk of failures and partial failures of crops, of the disasters, delays and expenses of unusual storms, snow and cold, of the great financial disasters which occasionally prevent or delay the movement of traffic, and of the burden of continuous operation whether profitable or unremunerative. It is an axiom in economics that the greater the risk the greater must the return be upon invested capital, and the conclusion is irresistible that a net return of 7 per cent per annum upon the respective values of the properties of these companies in Minnesota devoted to transportation is not more than the fair return to which they are entitled under the Constitution of the United States.

"Other exceptions were taken by the defendants, but they must be overruled, because they are not of the controlling character of those that have been discussed, and they are not sustained by the record. For the same reasons, the exceptions of the complainants must share a like fate.

"The findings of the Master must be confirmed. The fares and rates prescribed by the acts of the Legislature and the orders of the Railroad and Warehouse Commission which have been considered, have been, are, and will be, as to each of these railroad companies, unreasonably low, unjust and confiscatory. Each of those acts and orders is violative of the fourteenth amendment to the Constitution and void, and a decree for the complainant must be rendered in each of the cases.

"It is so ordered."

THE RAILROADS AND THE PEOPLE

By E. P. Ripley,

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There is just one point about the present relations between the railroads and the people of the United States as to which all agree. This is that they are very unsatisfactory. Opinions differ as to why this is so. Many say that the roads themselves, by numerous sins of omission and commission, raised and have prolonged the storm of hostile public sentiment which has been sweeping over them for some years. The shortcomings and abuses in railway management, it is argued, have made necessary, for the protection of the public, strict and detailed public regulation; and railway owners and managers, it is asserted, have not met in the right spirit efforts to secure such regulation. Senator A. B. Cummins of Iowa expressed a widely-taken view when he said on August 17 in a letter to me, "The trouble with the railway owners and railway managers is that, instead of loyally and finally accepting the supervising and regulating power of the government, and helping to make its exercise fair and effective, they resist every proposal to enlarge public authority, and resent every attempt to interfere with their management. The outcome is constant irritation and increasing turmoil."

Railway managers do not deny that many mistakes have been made and many abuses have grown up in the development and administration of American railways. But they do deny the truth and fairness of many of the counts in the sweeping indictments of the roads that have been made and printed throughout the country, and feel strongly that most of the public hostility to the carriers is unjust. They do not doubt that the public means to be fair. But they feel that it has allowed itself to be misled, to its own injury, by these wholesale charges of wrong-doing. They believe that some of the legislation that has been passed recently is wholesome. But they think that many laws that have been enacted, and many projects for further regulation which are receiving popular support, are unwise, because they aim to do things that are undesirable, or to secure ends the attainment of which would be impracticable even if it were desirable.

Railway transportation is one of our largest industries. It employs over a million and a half of men to whom have been paid over a billion dollars in wages in a single year. The concerns that make and deal in railway equipment and supplies, whose prosperity depends on that of the railways, employ perhaps as many more. Upon the amount their employers can pay these men depends the amount they can spend with the local merchant. Upon how much goods the local merchant can sell depends the quantity he can buy from the jobber. Upon how much the jobber can sell depends how much he can buy from the manufacturer. And upon how much the manufacturer can sell depends how much wages he can pay and how much raw materials he can purchase. Therefore, the prosperity of the entire country depends to a very large degree on the prosperity of the transportation industry. I do not take the narrow view that this is true only of the transportation industry. But how much all classes will be affected by the condition of any industry depends on how large and important it is, and how extensive are its ramifications; and the prosperity of all depends so much on the condition of the transportation industry because it is the largest, the most important, and the most extensive in its ramifications, except agriculture.

The country has been feeling the effects for the last three years of an unhealthy condition of the railway business. If the railways had spent as much in proportion during this time for operation and additions and betterments as they did in 1907, their expenditures for these accounts would have been during this period about four hundred million dollars larger than they were. If there had been during the last three years as much new railway construction in proportion as there was in 1907, the mileage built would have been seventy-two hundred miles greater than it was, which would have involved an additional expenditure of approximately three hundred million dollars. Who can doubt that the fact that the railways during these years greatly curtailed their expenditures has been one of the main influences protracting the depression? In order to keep abreast of the growth of commerce they should have increased instead of reducing their expenditures.

That the relations of the railways and the people have not been put on a better basis has not been because there is any antagonism between their interests, but largely because the officers of the railways, on the one hand, and the leaders of public opinion, on the other, often have not approached the subject in the right spirit. It would be a thankless and fruitless task to inquire who has been the more to blame; both sides have been at fault. The discussion of railway regulation has too often resolved itself into arguing over what rights are guaranteed to the railways, and what power over them is given to the people by the Federal Constitution. Now, it is very desirable that the relative constitutional rights of the public and the carriers should be clearly defined, thoroughly understood, and faithfully respected. But the people and the railways have a relation which is even more important than their constitutional relation. This is the relation indicated by the subject on which the editor of the *Atlantic Monthly* has asked me to write—their "ethical relation." An ethical relation involves reciprocal duties; and the constitutional rights of the railway and the constitutional power of the public do not mark the boundaries of their duties to each other. There are many things railways ought to do for the convenience and benefit of the public that they could not constitutionally be forced to do. And on the other hand, the criterion of the duty of the public as to adopting any proposed policy regarding the railways is, not merely whether it would be constitutional, but whether it would be just to the railways and for the good of the people. The proper relation between the railways and the people is that which, not merely temporarily, but in the long run, will best promote the "greatest happiness of the greatest number."

The formulation of correct general principles is important. Their practical application to specific cases is more important, and also more difficult. The principle that the proper ethical relation between the railroads and the people is that which will, in the long run, best promote the "greatest happiness of the greatest number" is easy to formulate; it will be universally accepted; but wide differences of opinion will arise as to its application. Yet it must be applied to practical affairs to be of any value.

The part of the railroad's business which has received the most discussion and regulation is its rates. Both the law and sound ethics require rates to be "fair and reasonable": that is, equitable as between different commodities, shippers, and localities, and not exorbitant.

Two widely different theories have been advanced as those which ought to govern the making of rates. These theories may be denominated as—

(1) The value of the service.
(2) The cost of the service.

The railroads themselves (and I think nearly all intelligent students of the question) advocate the former. There is little difference in the cost of transporting a car of automobiles and a car of sand, yet it is manifest that a rate which would be much less than fair for the automobiles would prohibit the movement of the sand; therefore, the rate on the sand, if moved at all, must be actually less than the *average* cost of moving all freight, while the rate on the automobiles must be very largely in excess of the average cost. A mere statement of this proposition should suffice to prove it. There is one point regarding this matter that many forget: this is that in all affairs there are two kinds of discrimination. There is the kind which, as the dictionary expresses it, "sets apart as being different," which "distinguishes accurately," and there is the widely different kind which "treats unequally." In all ordinary affairs of life we condemn as "undiscriminating" those who have so little judgment or fairness as not to "distinguish accurately" or "set apart things that are different"—who either treat equally things that are unequal, or treat unequally things that are equal. Now, when the railway traffic manager "sets apart things that are different," and treats them differently, he simply does what it is the duty of every one to do.

This shows what is meant by basing rates on the "value of the service"—on "what the traffic will bear." This method of making rates has been widely and vigorously denounced; but, when properly carried out, it is merely the "setting apart of things which are different" in a way that is highly beneficial. The free movement of all commodities promotes the "greatest good of the greatest number"; and as the adjustment of the rates on the various commodities roughly in proportion to the value of the services rendered in hauling them is an imperative condition to the free circulation of the cheaper and bulkier commodities, in so adjusting its rates the railway simply does its public duty. At all events, this policy has built up the business of the country to its present proportions.

Many, while conceding that the rates on different commodities must be adjusted according to the value of the service, contend that the rates for different hauls of the same commodity should be based on cost, or on distance, which is a rough measure of cost. Railroad men do not believe that rates ought always to increase *in proportion* to distance. They believe that here again we should "set apart things that are different." All statesmen and economists agree that free industrial and commercial competition promotes the public welfare. Now, the policy of American railways in generally making their rates lower in proportion for long than for short distances—in basing them on the value rather than the cost of service—has enabled producers throughout a large territory to compete in every market, and consumers to get commodities from every point of production in that territory; and has therefore, I believe, been of great benefit to the public.

Many persons who concede that distance must, to a considerable extent, be disregarded, argue that at least there can be no excuse for so far ignoring it as to charge a higher rate for a shorter than for a longer haul over the same line. But this, again, is often merely "setting apart things that are different." When a railway makes a lower rate for a longer than for a shorter haul, it is usually because it meets controlling competition either by water or by rail at the more distant point, which it does not meet at the nearer point. It could no more afford to make rates proportionately as low to the intermediate as to the more distant point than it could afford to make as low rates on all commodities as it makes on sand. If it quit meeting the competition at the more distant point, the shipper at the nearer point would not be benefited, because he would still have to pay the same rates as before, while the shipper at the more distant point would still be able to get his goods by the competing rail or water line at the same rate as before. The railway which had withdrawn from competing would be injured, because it would no longer get any of the competitive traffic; and shippers and consumers at the more distant point would be injured, because they would no longer enjoy the benefit of its competition with the other lines serving them.

This shows that the "greatest good of the greatest number" is often best promoted by almost entire disregard of distance in rate-making.

No doubt many will say that theoretically the value-of-the-service principle is right, but that many mistakes have been made and many abuses have developed in its application. This is quite true; there have been many discriminations which have consisted in "treating unequally," and for them the railways deserve condemnation. But unfair discriminations in rates afford the best illustration of the fact that, in order that the railway may do its full duty to the public, the public must do its duty to the railway. Secret rebating has been practically extirpated. For the fact that it and other forms of unfair railroad discrimination continued so long, and that some still exist, the public is much to blame. Since the original Interstate Commerce act was passed, there has not been a time when our laws regulating railways have not been so inconsistent and conflicting that railway men could not obey one part of them without violating another part. The best parts of the Interstate Commerce act are those prohibiting unfair discrimination. The big shippers and large centers of industry and commerce control a great deal of traffic. By withholding their business from roads which will not give them unfair concessions, and giving it to those which will, they have got many unfair advantages. In compliance with the provisions of the Interstate Commerce act, and in the performance of their duty to the public, the railways ought to abolish these unfair discriminations. But to do so, all competing railways must act in concert regarding rates; and under the Sherman anti-trust law such a perfectly reasonable and salutary combination by the railways has been held to be an illegal conspiracy! In other words, existing laws forbid the railways to discriminate unfairly, and then make it criminal conspiracy for them to take the only action that will effectually prevent unfair discrimination.

It may be said that, as the Interstate Commission now has authority to reduce any rate, and to prevent any advance in rates that it finds unreasonable, it is unnecessary for the railways to be allowed to act together to stop or to prevent unfair discrimination; that the Commission can do this. But unfair discrimination consists in the fixing of unfair relations between two or more rates, and may be due either to the fact that one rate is too high or that some related rate is too low. Therefore, anybody, in order in all cases fairly to correct discriminations, must be able either to reduce a rate that is too high or raise a rate that is too low. But the law confers on the Commission only authority to reduce rates and prevent advances.

The public very properly requires the railways to give it and all its patrons a "square deal." Have not the railways an equal right to demand a square deal from the public? And can they be said to be getting it as long as the laws are such that they cannot obey part of them without incurring the danger of punishment for violating another part of them? The Interstate Commerce law and the Sherman anti-trust law should be so modified as to permit railways to enter into reasonable agreements regarding rates. This is allowed in every other leading country in the world. The Interstate Commerce act should be further amended so as to authorize the Commission, when it finds a certain adjustment of rates unfairly discriminatory, to correct it by ordering either advances in the lower or reductions in the higher rates, according to which may be most fair.

For the last two or three years the public has been giving less attention than formerly to unfair discrimination, and more to the question of the absolute amount of the rates that ought to be allowed to be charged. As has already been said, it is the duty of the railway not only to make its rates fair as between different commodities, shippers and communities, but also to make them reasonable—that is, not excessive. I believe the railways of the United States have fully discharged that duty. Traffic cannot grow rapidly on excessive rates; and industry and commerce cannot thrive on them. But traffic and industry and commerce have increased in an unprecedented and unparalleled degree on the rates made by American railways.

If further evidence be desired that the rates of the railways of the United States have been reasonable, it can be found in a comparison of them with those of the railways of other countries. Such comparisons are deceptive unless account be taken of the differences between transportation and industrial conditions here and abroad; but, making generous allowance for all these differences, it is conceded by every competent economist who has ever investigated the subject that the rates of our railways are the lowest in the world.

A railway, however, has not discharged its full public duty even when it has made its rates both fair and low. It is also its duty to treat its employes well, and to give good service to the public. That the railways of the United States, while keeping their rates low, have done well by their employes, is amply demonstrated by the statistics regarding the wages paid them. While railway rates have remained almost stationary, railway wages have increased during the past ten years about twenty-three per cent; and railway employes are today—as, in fact, they have been for years—the highest-paid workingmen in this or any other country. It is the duty of railways, not only to treat their employes well, but, whenever at all possible, to reach settlements of disputed points with them in an amicable way. This duty was not fully appreciated in past years, and the consequence was strikes and lockouts which caused enormous trouble and loss to the public. It is a duty which has been fully appreciated and performed in later years, and, in consequence ,there has been no very serious interruption to commerce, due to railway strikes, for a long time.

As to railway service in general in the United States, it has many shortcomings; but the managements of the roads are constantly striving to make it better; and the great improvements that have been made in it in recent years ought to be sufficient evidence that they will in course of time make it as good as any one can reasonably ask, if they are allowed to charge rates that are reasonably proportionate to the value of the services they render for them.

There are many persons, however, who think that the reasonableness of rates should be measured by some other standard than the value of the services rendered for them. They contend that all a railway is entitled to is a "fair return" on the fair value of its property; that a fair return is the current rate of interest; and that if it is earning, or in future shall earn, more than this, then its rates should be reduced. Is that an equitable proposition? It is true that the railway's service is public and it is therefore subject to regulation; but its ownership is private. When private capitalists built our railways they did so with the understanding that if they gave good service at fair and reasonable rates their duty to the public would be discharged; and that, in return, the public would no more limit the *profits* they derived from their business than it would limit the profits derived by investors from any other business. The railways have in the main carried out their part of the bargain. Now, obviously, the proposition so to regulate rates as to limit the earnings of railways to a "fair return" is a proposition, not merely to require their *rates* to be reasonable, but to limit their *profits* in a way that profits in no other business ever have been limited in any other commercial undertakings in any country on earth.

It is sometimes said that the fact that railways exercise the power of eminent domain gives the public a special right narrowly to limit their profits. But the power of eminent domain can be exercised only for the public benefit; railways are allowed to exercise it only because otherwise they could not be built at all, and because their construction and operation is of benefit to the public. On what theory of equity can the exercise by the railroad of a power which is conferred on it, and which it exercises for the public good, be turned into an argument for so regulating it as to make it less profitable than concerns which do not serve a public use, but merely serve a private purpose?

One of the greatest difficulties in the way of so regulating rates as to limit each railway to a "fair return" is that railways differ as widely as individual men. Some roads are favorably, others unfavorably located. Some managements have great, and others only moderate foresight and ability, and others almost none. To limit the profits of the favorably located and well-managed railways to the current rate of interest would deprive them of the rewards of, and the incentive to good management. As rates on all competing roads must be the same, it would prevent weaker roads from earning any return, and bankrupt them. How is it possible that any one can believe that such a policy would be just either to the strong or to the weak roads?

If one formed his opinion solely by following the discussions of railway rates, he would conclude that all the public wants is low rates, and that it is willing that the railways should reduce the quality of their service indefinitely if this be accompanied by proportionate reductions in rates. But this is far from the case. Railway men are beset constantly by demands for reductions and opposition to advances in rates. But they are beset just as constantly by demands for improvements in service. The pubic cannot both eat its cake and have it. It cannot at the same time get, and ought not to ask, both lower rates and more expensive and better service. Which of the pubic's demands, then, ought the railways, with the co-operation of the regulating authorities, chiefly to seek to meet?

It seems to me that they ought mainly, at least for some years to come, to try to meet the public's demand for better service. For railway rates in this country are the lowest in the world. In some respects, railway service here is the best and most efficient; but every one knows that there are many improvements in service which ought to be made in the interest of the public safety, convenience and economic welfare.

The statistics of accidents on American railways are only too familiar. I need not repeat here the harrowing details to show the need of making our transportation safer. About eighty per cent of railway accidents are caused by mistakes, or reckless violations of the rules of the companies by employes; but a great many are due to defects and shortcoming of the physical plants of the railways. The total number of miles of railway in the United States on June 30, 1909, was 236,869. Block-signals are very useful in preventing accidents, even on roads where traffic is comparatively light, and are absolutely requisite to safe operation where it is heavy. Yet a report of the Block-Signal and Train-Control Board of the Interstate Commerce Commission shows that on January 1, 1910, the mileage operated by block-signals was but 65,758 miles, or only twenty-seven per cent of the total, and that of this only 14,237 miles were operated by automatic blocks. In the interest of public safety there should be a very great increase in the mileage of block-signals.

In order to make their service safe, many roads will have to do an amount of work for the strengthening of their tracks which will amount practically to reconstruction of large parts of them, or, in the cases of not a few roads, of all of them. In the course of time all grade crossings between railways, and between railways and highways, ought to be eliminated. Many other costly improvements ought to be made to render transportation safe; and the roads are not only willing, but anxious to make them as fast as their financial resources will permit, and also to submit to and comply with all reasonable legislation intended to promote safety. It is significant that while the railways have contested in the courts a great deal of legislation regarding rates, they have never tested the validity of the original federal safety appliances acts, although their constitutionality has always been doubtful, but have faithfully complied with them; and that at great expense, they are now pursuing the same policy in reference to the new safety appliance act passed by Congress in 1910. Railway managers are just as anxious to make their service safe, both for their employes and for passengers, as the public is to have them do so. The main difference between them and those who criticise them is that the railway managers appreciate more keenly the expense that must be incurred, and the difficulties that must be overcome, in making transportation safe.

Every railway manager in the country has in his files scores of petitions for the construction of new passenger stations. These vary in importance and amounts of money involved from the request of villages that their little wooden depots be replaced by larger and more pretentious brick ones, to the demands of cities, such as Kansas City, Washington, Chicago and New York, for new passenger terminals and stations costing from $20,000,000 to $100,000,000 each. In many cases the roads are asked to build, not only handsome and expensive stations, but to surround them with beautiful parks. The railways at Kansas City, as one of the conditions of the passage by the city of an ordinance authorizing them to build a new union station, are giving the public a park adjacent to it costing $500,000. The appearance of the railway station and grounds considerably influences the opinions visitors form of a town or city, and it is perfectly natural that the people should desire them to be commodious and beautiful. The public constantly grows more exacting in its demands for comfort, and even luxury, on passenger trains, and for their strict adherence to their schedules, so that the traveler can tell with unvarying accuracy at what time he will reach his destination.

Shippers constantly ask more and faster freight service. There has been during the last several years a great deal of complaint because the roads have been unable in the busiest parts of the year to handle promptly all of the freight traffic that has been offered them. In order that they may become able to do this they must build numerous extensions and branches, and many miles of second, third and fourth track. The railways of the United States today are practically a single-track system: of the 236,869 miles of line, only 21,000 miles are double-tracked. The roads must also greatly enlarge their terminal facilities and provide hundreds of thousands of new cars and locomotives.

The roads ought to make all these great improvements. But it is perfectly evident that if they are to be made, they must be paid for; and that if they are to be paid for, the public has a part to perform—that of letting the roads earn whatever is necessary to make it practicable to pay for them. Now, while some improvements increase the earning capacity of a railway, others do not. For example, from the $500,000 the roads are spending on a park at Kansas City they will never derive a dollar of return. They are spending two or three million dollars on the union depot at Kansas City. A station which would serve adequately all purely transportation purposes could be built for $200,000. On the difference between these amounts the roads will receive no return. Similar comment might be made on all large passenger stations. They are built for the benefit of the public, not for the profit of the railroads. Elevation of tracks and separation of grades increase to some extent the efficiency of railway operation, but the amount by which they reduce operating expenses is far less than the interest on their cost. The amounts by which the enlargements of terminal facilities in big cities, which must be made if the growing traffic is to be properly handled, will increase net earnings, will in many cases be less than the interest on their cost.

Improvements which increase earning capacity ought to be capitalized because they afford the means for paying interest and dividends. But suppose the total investment of $2,000,000 in a passenger station be capitalized. In twenty-five years the interest on the investment at four per cent will have equaled the original cost. At the rate this country grows, the station may then be so obsolescent that it must be replaced by another station, costing perhaps $6,000,000. If this station also be capitalized, the road will thereafter have to pay interest on the $8,000,000 it has spent on the two stations, although it will have but one station.

Now, if a railway is allowed to earn nothing over a "fair return," it will have no earnings to invest in improvements; in that event it will have to make from capital improvements that do not increase earning capacity; and that would result in a rapid and heavy increase of capitalization. Would that be fair to posterity? That the English roads have piled up a capitalization of $314,000 a mile is very largely because they have paid for all improvements and betterments out of capital whether they increased earning capacity or not. Unable to raise their rates high enough to earn a return on this enormous capitalization without imposing an intolerable burden on commerce, they are now threatened with general insolvency. This is the situation American railways would be facing in a comparatively few years if the policy of narrowly limiting their net earnings, and thus forcing them to make all improvements from capital, were adopted.

If the public can and shall regulate railway profits, it should adopt the policy of letting the railways, or at least the better-managed ones, earn as much to be spent on improvements as they pay out in dividends on a reasonable stock capitalization. If, for example, a road is paying seven per cent on its stock, it ought to be allowed to earn an equal additional amount with which to make improvements. This policy, which is the one followed by well-managed industrial corporations, would both allow the better-managed roads to enjoy the benefits of their good management, and protect the weaker roads from reductions in rates which would bankrupt them. It would also strengthen railway credit. That the railway exercises the right of eminent domain, is held to give the public a special power to regulate it; but when it goes into the money market to raise capital, the power of eminent domain gives it no better credit than that possessed by an industrial corporation. If it is barely able to earn its dividends, the investor will know that if bad times come it will become unable to meet its obligations to its bond and stockholders, and he will not invest in its securities except at a discount proportionate to the risk taken. Therefore it is necessary for the railway in good times to earn more than its interest and reasonable dividends, not only that it may have surplus earnings to invest in improvements that will not increase its earning capacity, but also that it may be able to get on reasonable terms the capital necessary to make extensions and improvements which will increase its earning capacity.

It may be replied that if the railways are allowed to earn large profits in order to have earnings to invest in improvements, they will subsequently capitalize all such investments, and then seek to make the public pay a return on them, and that, to prevent this, the public should regulate their issuance of securities. The past history of our railways, which is the only thing we can judge by, is against this theory. Some railways have capitalized earnings invested in the properties, but many have not. The amount of invested earnings that has not been capitalized greatly exceeds the amount that has been. And it is due largely to this that American railways are now the most conservatively capitalized railways in the world. This statement will be received with incredulity by most people. The public has lent an all too willing ear to the oft-repeated misstatement that our railways are over-capitalized. It is true that some of them are, but who can believe that they are as a whole after reading the following figures regarding the capitalization per mile of the railways of our own and other countries: United States, $59,259; Argentina, $59,930; New South Wales, $63,999; Canada, $66,752; Switzerland, $109,000; Germany, $109,788; France, $139,290; United Kingdom, $275,040; England alone, $314,000?

If the public, in order to enable the roads to make needed improvements in their facilities, shall permit them to earn more than enough to pay substantial dividends, the roads, no doubt, will be under a moral obligation properly to invest the surplus earnings in the properties and to abstain from capitalizing them. It has been proposed to subject the issuance of railway securities to regulation by the Interstate Commerce Commission; and undoubtedly, if the roads did not deal fairly with the public in regard to this matter, this would strongly reinforce the argument for such regulation.

There are many other points regarding the relations of the railways and the people on which I should like to touch if space permitted. The one point, however, that I am most anxious to drive home is the one that comes out most prominently in the intelligent discussion of every phase of the railway question—namely, that the duties of the railways and the people, whether in regard to rates, or service, or capitalization, or any other feature of railway policy, are equal and reciprocal. This must always be true while the service of the railways is public and their ownership is private. The public, on the one hand, and the private owners of the railways, on the other hand, have exactly equal rights to demand that each shall give the other a "square deal." When either asks much, it must, for equitable as well as economic and legal reasons, be prepared and willing to give much in return.

Up to a comparatively few years ago, the public probably did its duty by the railways better than the railways did their duty by the public. Broadly speaking, the management of our railways was good; but some deplorable abuses characterized railway management. The public was amply justified in growing incensed at these conditions, and taking vigorous measures to remedy them. But the course the public actually has adopted has not been fair to the railways, or to itself. It has not been content merely to pass and enforce laws for the suppression of the real evils in railway management. It allowed itself to be hurried into a fit of passion against the roads; and this has been succeeded by a prejudiced mental attitude toward them. The result has been that it has given willing ear to innumerable glaring misrepresentations of them, and has passed numerous laws which are extremely unjust and injurious.

Take, for example, its attitude toward secret rebating. This was the most pervading and pernicious abuse that ever developed in the railway business in this country, and the public was justified in adopting measures for its suppression. But the public has been unfair in that it has habitually refused to give due weight to the fact that no rebate was ever given which was not received by some one; and that the recipients were just as guilty as the givers; or to the further fact that the railways tried repeatedly to stop rebating, and did more than any one else to get passed the Elkins act of 1903, which did more to suppress that evil practice than any other piece of legislation.

Again, the railways have been bitterly denounced by the press, public men, and the people, for having at times used corrupt means to prevent the passage of laws which their managers thought would hurt them. The use of such means was ethically indefensible; but the people were largely to blame for it. The people elected corrupt men to the legislatures who introduced measures whose passage would have been injurious to the roads, and the purpose of whose introduction was to blackmail them. No doubt the roads should have submitted to the passage of these unfair measures instead of submitting to being blackmailed. But can the people who elected these men to office fairly lay all the blame on the railways for the corrupt bargains which their chosen representatives struck with the representatives of the railways? The railways all over the country are now trying very hard to avoid entirely the use of improper measures to influence legislation. They have a right to ask that the public shall meet them half way in this matter. But the blackmailing lawmaker still regularly turns up in many of our city councils and state legislatures.

Once more, some newspapers and public men have purveyed for public consumption, and the public has accepted, the most tropical misrepresentations of railway capitalization. For example, certain public men have repeatedly asserted that the railways of this country are over-capitalized to the extent of $8,000,000,000. Now, there is not one scintilla of evidence to support that statement. Every fair valuation of railways which has been made by commission or court has shown that most of the railways valued were capitalized for less than it would cost to reproduce their physical properties. Only a short time ago I saw the statement in the Washington correspondence of one of our leading newspapers that our railways are capitalized for an average of $235,000 a mile. The writer of that statement, and the readers of it, could have found by investigation that there is not a single railway in this country capitalized for as much as the amount stated, and that the average capitalization of our railways, as reported by the Interstate Commerce Commission, was, on June 30, 1909, as already stated, but $59,259 per mile. But the public has not investigated misstatements such as this, which are quite worthy of Baron Munchausen. It has accepted them as the true gospel, and it is mainly owing to this that there is today in progress a wide-spread agitation for a physical valuation of railways which is being conducted on the utterly erroneous theory that the railways are charging excessive rates to pay a return on excessive capitalization, and that for the protection of the public their value must be ascertained and used in future as a basis for the regulation of rates.

Meanwhile, the attitude of the railway managements has been changing. The duty of the railways to the public is now more clearly recognized by their managers, more frankly conceded, and more fully and faithfully performed than it ever was before. In consequence of these changes, I believe that it can truthfully be said that, whereas up to a few years ago the public did its duty to the railways better than the railways did theirs to the public, the reverse is now the fact; and that the railways have a right to complain that they are now doing their duty to the public much better than the public is doing its duty to them.

To remedy the present unsatisfactory condition it is needful, on the one hand, that railway managers as a class shall clearly see and frankly concede that they are quasi-public servants, owing a different and a higher duty to the public than almost any other business men, and act accordingly. They must also recognize that their duty does not consist merely in making reasonable rates, giving good service, and honestly managing the properties entrusted to their care for the benefit both of the owners and the public, for the public has a right to interest itself in all the various questions about railway policy that arise; many of these questions are very complicated; and it is a duty of railway men, which usually has been rather poorly done, to discuss these questions with the public fully and candidly, that the public may know the imperative practical conditions which require the railway business to be managed on much the same commercial principles as other businesses, and why it is to the interest of the public that it shall be so conducted.

On the other hand, it is the duty of the public to disabuse its mind of much of the misinformation and prejudice about railways with which it has been filled by the anti-railway agitation of the last five or six years. As it is the duty of railway managers to remember and to act always in accordance with the fact that the railway is a public service corporation, so it is the correlative duty of the public always to remember and act in accordance with the fact that the railway's ownership is private; that the private persons who own it have the same right to demand protection in the enjoyment of their property rights as the owners of any other private property; and that unjust attacks on their rights of property are just as immoral as attacks on the property rights of the manufacturer, the merchant, or the farmer, and will, in the long run, react just as disastrously on the welfare of the country. The people can make the ownership as well as the service of our railways public if they wish to; but as long as they do not do so they cannot fairly treat them as if they were public property.

It is perfectly feasible to establish proper ethical relations between the railway and the people; but I know of no way in which this can be done except by following substantially that noble rule, whose influence is all too seldom felt in modern politics and business, of each doing by the other as he would be done by.

EFFICIENT RAILWAY MANAGEMENT*

By Howard Elliott,

President of the Northern Pacific Railway.

Extract From an Address Delivered Before the "$100 An Acre Club," Valley City, N. D., March 16, 1911.

At this time, when the question of the railways of the country and their rights and requirements are so prominently before the public, there is one point on which it is possible for both the public and the railway management to agree; that is that the railways must either earn or borrow the money which it is necessary to procure to meet the expense of improving old lines and the cost of new lines, and furnishing better trains and better service, which are not only demanded by the public but are a necessity if the railways are to keep abreast of the normal growth of the country. Suggestions have been made based on theories and methods yet in an experimental stage and therefore unproven, among which none has claimed more space in newspapers and magazines than the assertion that American railroads can save $300,000,000 a year—a million a day—by what is termed "scientific management."

It is unfortunate that at a time when all railroads are face to face with the problem of stemming a rising tide of expense and all the serious business consequences this situation entails, they should be compelled to submit to so bald and blunt a criticism of the efficiency of their management. So widely has public attention been caught by this radical statement that it has seemed desirable that the public be told what it amounts to as a business proposition.

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*The statement which made Mr. Louis R. Brandeis famous over night that "by scientific management the railroads of the United States could save $1,000,000 a day," was quoted from a loose utterance of Mr. Harrington Emerson, and neither the father nor its sponsor has contributed a serious word in its support. The $365,000,000 a year which it represented was immediately subjected to a discount of 18 per cent, bringing it down to $300,000,000 a year. This was necessary to leave any margin at all for the division of maintenance of equipment, which in the year 1909 amounted to only $357,044,994, excluding switching and terminal companies.

Although the remaining $300,000,000 has been brushed into the scrap heap of scientific buncombe by the Interstate Commerce Commission, its ghost and the million dollar a day fable continue to haunt the popular discussion of the railway situation. Therefore, it has been thought advisable to include in this issue of The Railway Library a discussion of the subject from several points of view.

Railroad officers are spared this task, however, because the Interstate Commission has discussed it tersely and effectively in the recent opinion about the advance of freight rates (Case No. 3400).

The Commission declares that no part of the advance cost of railroad operation could be made good by "scientific management," as advocated by a witness in this case, and repudiates the theory in the following language:

"*It was, however, earnestly insisted by the shippers that the railroad might and should find other kinds of economies with which to make good this increase in wages. Several prominent manufacturers testified that in their business in recent years, wages had been advanced but that they had not been able to make corresponding advances in the price of their product and were therefore forced to look about for other ways in which to take up the increase in the cost of production.*

"*It was claimed that by the introduction of what was termed 'Scientific Management,' the purpose of which was in various ways to make labor more efficient, at the same time increasing the wage paid the laborer himself, much more than the amount of these advances could be saved. One gentleman who described these methods testified that they had been introduced to some extent into the operations of railways with remarkable results, and that from a careful analysis and computation he was satisfied that not less than* $300,000,000 *annually could be saved by the proper application of these methods to the business of railroading in the United States.*

"*It is difficult to see exactly what application the Commission can make in this case of this testimony. The witness, who apparently had most to do with the originating and applying these methods, testified that they were in acual operation in not over one-tenth of one per cent of all the manufacturing establishments of this country. The system is everywhere in an experimental stage. To some extent it has been tried and is now being tried by our railways. The representative of railway labor who appeared before us, stated that the methods could not and should not be introduced into railway work. Upon this record we can hardly find that these methods could be introduced into railroad operations to any considerable extent, much less can we determine the definite amount of saving which could be made. We cannot, therefore, find that these defendants could make good any part of these actual advances in wages by the introduction of 'scientific management.'*"

There is no necessity for comment upon so thorough and decisive a decision that this theory of railroad management is visionary and impractical. It might well be said of our railroads, that without dressing their methods in imposing terms and giving their ordinary practices an undue and fictitious importance, they have for years been exceptionally active in ferreting out and applying all new ideas that promised better efficiency. All business has been seeking to find the best and most economical methods, and railways have led rather than followed in the adoption of better ideas.

For many years our railroads and our leading American manufacturers have been applying "scientific management" to their business, and when new methods have been proven to possess merit, have been quick to adopt them.

"Scientific management," as it is now being discussed in the magazines and newspaper press, would have more weight with railroad officers and business men if it were something new, and something more than the theory of one who during all his business life has been a lawyer. It would be more valuable as a suggestion if it did not consist of ideas which have been discussed many times before by practical men, and from which all that is good has been already sifted and applied to actual business.

In the decision which embodied the opinion of the Commerce Commission upon "scientific management" there also occur several illuminating statements about the importance of railroads to business in this country, which, from such a source, are of great significance. The Commission says:

"*Next to agriculture, our railroads are our greatest single industry. In their ordinary operation and maintenance great numbers of laborers and vast quantities of supplies are used. Railroad extension would mean the employment of additional labor and the purchase of additional material and equipment.* * * * *So far as such expenditures are legitimate they ought to be encouraged. Our railroads should be kept in a high state of efficiency and railroad charges should be sufficient to permit this. Necessary extensions and improvements should be made and the treatment of the railroads by the public should be such as will inspire that confidence on the part of the investing public necessary to obtain funds for such additions.*"

An important phase of the railroad question, that involved in the fact that to meet the demands of the public for the best local facilities, the best trains and the best service, the railroad must frequently make investments which in the nature of things can never become revenue-producing, is touched upon by the Commission in this language:

"In the development of a railroad, it must often invest money in permanent structures like a passenger station which will not add for the time being to its revenues. * * * *It is reasonable to say that such rates may be charged as will permit the accumulation of a fund to take care of cases of this sort."*

Again:

"The economies just referred to, like the reduction of grades and use of larger equipment, have necessitated large outlays of capital, and upon this an additional return must be earned.

"Taxes have increased and are increasing more rapidly than the value of the property.

"All these influences tend strongly toward higher freight rates, for they not only add to the cost of operation but they increase the cost of the plant, upon which a return must be made. * * *

"The demands of the public will continue to add to both the expense of operation and the cost of the plant. Greater safety of operation will be insisted upon and will require the outlay of considerable sums of money upon way and structures, and also extensive changes in equipment, and will still further add to the cost of operation itself by requiring the employment of additional men and the use of the men under different conditions.

"It was said by the railway representatives that this increase in expense can no longer be offset by the introduction of further economies in the future, as in the past, and it seems probable that (in the future) the same kind of economies cannot be relied upon to the same extent."

I infer from this that the Commission believes the railroads cannot go much farther in employing more efficient methods to offset increased expense.

EFFICIENCY

BY FRANK TRUMBULL.

Chairman of Board Chesapeake & Ohio Ry.

AN ADDRESS AT THE DINNER OF THE CANADIAN CLUB OF NEW YORK, MARCH 14, 1911.

The Interstate Commerce Commission handed down, nearly three weeks ago, its decisions on the proposed increases in freight rates. I think three things may be affirmed about these decisions:

FIRST—They have put at least one brake upon higher costs in this country.

SECOND—They have put another brake upon voluntary reductions of rates because, under the new law and these decisions, the burden of proof for future increases or restorations is upon the railroads.

THIRD—The present law amply protects the shippers of this country against extortionate rates. America has already the lowest rates and the highest wages in the world and apparently is to retain both.

I made no predictions before the decisions were rendered; I make none now as to their ultimate effect. There is one bright and shining sentence in them, to-wit: "Our railroad management should have wide latitude for experiment; it should have such encouragement as will attract the imagination of both the engineer and the investor." The response which the country will, in the long run, give to this sentiment is the important and far-reaching answer. The crop of short-term railroad notes now coming out would indicate that the country's "imagination" is still a little near-sighted, but it may get over that and we hope it will. We hope the Interstate Commerce Commission is right. Some phases of the decisions might have been appealed to the newly created Interstate Commerce Court, but the railroads have accepted the verdict of the Commission and are going ahead to do the best they can. They look forward, not backward.

During the discussion a new slogan—EFFICIENCY—has captured the country. Brandeis is the man of the hour. His figures look large to most of us, but the idea will survive and should be cultivated in all lines of business. The total expenditures last year by the railroads of the United States for repairs to all the locomotives and all the cars and for engine fuel amounted to about $600,000,000. It is claimed that we can save half of that, or $300,000,000 a year. When I read "$300,000,000" I thought of the story of the Grant family. It is said to be one of the oldest families of Scotland, and the tradition is that the verse in the Bible which reads, "There were giants in those days," is a misprint; that it should read, "There were Grants in those days." I thought perhaps "$300,000,000" was a misprint and it was meant to read $30,000,000, but we will not quarrel over figures. If even $30,000,000 can be saved it is certainly worth saving. I read in the *Sun* one day last week that the average cost of a cold in the head is $44.34—and I have read somewhere, "If you see it in the *Sun*, it's so." What a railroad official wants to know is this: If his company can reduce the cost of the cold in its head from $44.34 to $37.34, *who will get the seven dollars?*

We are counselled to look in, not out. My suggestion is that we do both. First, let us look in. If you should write a letter to an American railroad official, his corporation will have to haul a ton of freight—two thousand pounds of average freight—coal, ore, silks, ostrich feathers, and everything—for more than two and one-half miles to get money enough to buy a postage stamp to send you an answer. Out of that kind of service the corporation must pay its employes, buy its materials, pay its rents and taxes, interest on its debt, and make its living. Can you beat it? Can YOU beat it, Mr. Lawyer, Mr. Doctor, Mr. Merchant, Mr. Banker, Mr. Farmer? Is there maximum efficiency in the practice of law? If there is, why are so many contracts and wills taken into court? Why is any court decision ever reversed? Every lawsuit that is won is also lost. If there were maximum efficiency, why should any suit ever be lost? How could so many expensive hours in court rooms be absolutely wasted? If there were maximum efficiency in banking, would there ever be any bank failures like those, for example, we are now reading about from day to day? Would any merchant ever fail? Would not every farmer get a blue ribbon? If there is maximum efficiency in the practice of medicine, why are there so many undertakers? If it took the Creator six hundred thousand years to make a bed of coal, perhaps the perfect railroad official is yet to be born. Perhaps other perfect people will be born at the same time. You see I am not despondent.

Now, let us look out a little. It is particularly appropriate at a Canadian Club dinner that we look at Canada. As I understand it, your form of government is in one respect just the opposite of ours, viz., your Dominion Government has all the powers not granted to the Provinces, while our States have all the powers not ceded to the Federal Government. What has that to do, you say, with railroads? This: When our United States railroads fall ill from their own indiscretions or otherwise, forty-seven doctors step in—that is, forty-six States and the Federal Government—whereas under your form of government a railroad chartered by the Dominion is regulated by the Federal Government only. See the enormous loss in efficiency and the great strain on the patient under our methods as compared with yours. This winter there have been introduced in the State legislatures of the United States four hundred and sixty-nine bills affecting the mere operating questions of railroads, besides scores of other bills affecting railroads in a multitude of ways. Of the four hundred and sixty-nine bills, fifty-six are so-called ''Full Crew'' bills, each of which, if enforced, will add to the railroads' cost of living.

Railroad development in the United States is dependent not only upon the imagination of the engineer and the investor but also upon the legislation of the Federal Government and forty-six States. There will soon be forty-eight. The development of one State may be dependent upon the legislation of another State a thousand miles away.

Let us look out again, and this time across the water to England. Railroads there are permitted to work out *joint* economies. Let us cross the Channel and look at France. That Republic is districted off and wasteful duplication of railroad service is absolutely eliminated. Each company has a monopoly in its district. One French railroad corporation pays dividends of eighteen per cent. per annum on its stock; the others pay seven per cent. or more. And out of their revenues an amortization or sinking fund is also paid to the owners under which the Republic will become the proprietor of the railroads about the middle of this century.

Reciprocity with Canada has caught the popular imagination. We have no tariff fences between our States. Minnesota and Oregon are not afraid of Dakota, or of Georgia, or of Alabama. Why should all of us together be afraid of Canada, or why should Canada be afraid of us? We absorb in ten or twelve years as many competitive immigrants as the whole present total of your population. We have shown the world a 3,000-mile boundary line without a fortification or a battleship. We shall undoubtedly sometime show all peoples a 3,000-mile boundary line without a tariff fence. We shall partake of your bounty and you of ours. We shall sit down at one hospitable table—under two flags, of course—but as one family on account of the ties of consanguinity—the ties of our common ancestry. The table will stretch not only across a continent, but also from the Arctic Circle to the Gulf of Mexico. The needs of a nation, including the regulation of its railroads, are bigger than Fishhurst-by-the-Sea, or Lumberburg, or Cornville. Your efficiency will sharpen our efficiency. If any of your methods as to government, or banking, or labor questions, or railroads, are better than ours, perhaps we will be wise enough to borrow some of them. While we are depending upon the imagination of the investor for railroad development, you are right now engaged in what is practically a profit-sharing arrangement with the investors in your railroads. If the option to take out a Federal charter for a railroad is good for you, perhaps such an option will be good for us. Maximum efficiency will require us, sooner or later, to eliminate all burdens on interstate commerce. We will learn to say, "The United States *is* a Nation," not "The United States *are* a Nation." The Brandeis idea is right. What we need is more efficiency. Let every man apply it in the activities of his own life, and let all of us together adopt it on a wider and wider scale—and incidentally use it to augment international trade. The more we study efficiency, the more we will discover that the Interstate Commerce Law amply protects the country against extortionate rates and discriminations. The anti-trust laws, at least so far as railroads are concerned, involve an appalling waste of energy. We do not need both laws for the railroads any more than a State needs two Governors. Maximum efficiency entitles the people to have the commerce of this great country sent over the lines of least resistance. Duplication of train service, wasteful car supply, unnecessary hauls of empty cars, duplication of capital, and all that sort of thing ought to be cut out. If this could be done I have no doubt that one hundred million dollars a year could be saved in the operation of American railroads with which to tempt "the imagination of both the engineer and of the investor."

In efficiency, American railroads have been pioneers, not laggards. All things considered, they already are the most efficient in the world, and if "scientific management" of the anti-trust laws could be adopted our railroads would excite the admiration of even our own countrymen. Let us drop the old quotation: "In time of peace prepare for war," and in its stead say to our neighbors, "In time of friendship let us prepare for more friendship." In time of efficiency prepare for *more* efficiency. More abundance for the many. Let *things* be cheaper—and men, women, and children more valuable. The welfare of our race, and therefore the welfare of all races, is bound up in the one word, EFFICIENCY.

SCIENTIFIC MANAGEMENT OF RAILROADS

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The most striking feature of the recent public hearings before the Interstate Commerce Commission, in the matter of proposed increases in freight rates, was the charge of railroad inefficiency. Mr. Brandeis's clever turn in attacking the railroads in the quarter where attack was least expected called sharp attention to the subject of railroad management. The public was caught instantly by the dramatic statement that the railroads could save *a million dollars a day* through the adoption of a new system of scientific management, and their lively interest in it was kept up by newspaper and magazine discussion. In getting at the truth, the public had little constructive assistance from the railroads, and their disdainful attitude added to the first effect of the charges. The general impression, therefore, was that the railroads were needlessly deficient.

It is advisable to examine the charge of inefficiency apart from the rate question, which is now settled. It is, perhaps, comprehensible that the railroads, already harried by public attack and suspicion, and now reproached unjustifiably, as they think, should be indignant at being presented with a new pill to swallow. Perhaps they may be pardoned for looking on it as a quack remedy. But it behooves the student of railway problems to examine the new prescription carefully and, so far as may be, impartially to inquire whether the railroads have some justification for distrust, to ascertain if the extent of waste is as great as suggested, to indicate some of the limitations on the adoption of any system of scientific management, and to suggest what may be learned with profit from its advocates.

It is necessary at the outset that we have a clear understanding as to what is meant by scientific management. To obtain it, we will go at once to headquarters. Mr. Frederick W. Taylor, consulting engineer, Philadelphia, is acknowledged as the dean of the efficiency experts and the originator of the new system. Mr. Taylor was conspicuously successful in his management of the Midvale Steel Company, where he was successively laborer, foreman, superintendent and general manager. There his system was first worked out. In addition, he has also made an international reputation as the inventor of high-speed steel for metal-cutting tools and drills, an achievement in itself sufficient to stamp him as a man of remarkable scientific attainments. The history of the gradual evolution of his system of shop management, his successful efforts to systematize and conserve labor, and the experiments in evolving high-speed steel, reads like a romance.

The fundamental principles of Mr. Taylor's system are definite, and are set forth by him as follows:

> *First.* Each man in the establishment, high or low, should daily have a clearly defined task laid out before him. This task should not in the least degree be vague or indefinite, but should be circumscribed carefully and completely, and should not be easy to accomplish.
>
> *Second.* Each man's task should call for a full day's work, and, at the same time, the workman should be given such conditions and such appliances as will enable him to accomplish his task with certainty.
>
> *Third.* He should be sure of large pay when he accomplishes his task.
>
> *Fourth.* When he fails he should be sure that sooner or later he will be the loser by it.
>
> When an establishment has reached an advanced state of organization, in many cases a *fifth* element should be added, namely, the task should be made so difficult that it can only be accomplished by a first-class man.

Under the first principle, the difference between the Taylor plan and ordinary practice lies in the very careful study (by experts with stop watches) of each element in each task, so that definite information is available as to how long it should take. In ordinary practice, the fixing of piece-work rates is left to the judgment of the foreman or piece-work specialist, and the rates are often changed. Under Mr. Taylor's plan rates are inflexible unless conditions change.

In the application of the second principle, Mr. Taylor goes much further than is customary in standardizing tools and machine tools and machine accessories, and systematizing the storing and distributing of materials, sharpening of tools and the like. Two unique features are the planning department and functional foremanship, the latter calling for a corps of specialists, each with a single function, instead of the military type of organization, under which the foreman is responsible for the work and discipline of all the men under him and all the machines which they use. The planning department is designed to take out of the hands of foreman and men all the planning of work and how it is to be done. The workman is merely to act upon written instructions. To make sure that the work is properly performed, the supervision formerly divided between the superintendent and foremen is assigned to a number of persons: (1) the gang boss, who has charge of the preparation of all work up to the time it is set in the machine; (2) the speed boss, who sees that proper cutting tools are provided and machines properly operated; (3) the inspector, who is responsible for the quality of the work; (4) the repair boss, who sees that the workmen keep their machines clean and properly oiled; (5) the route clerk, who lays out the exact route by which each piece of work must travel from machine to machine; (6) the instruction card man, who has charge of making up written instructions for each job; (7) the time and cost clerk, who prepares accurate cost data; and (8) the shop disciplinarian, who handles all matters of discipline and adjustment of disputes.

The foregoing briefly describes what is meant by scientific management *in shops.* As a system, its details have been well developed and it is in successful operation in a number of important manufacturing establishments. For branches of railroad work outside the shops, however, no definite plan has been worked out, nor have any experiments been made to determine whether the principles or details of *shop* scientific management are superior to the best practice of well managed roads in activities outside of the shops.

Mr. Brandeis, in his brief in the rate controversy, is not so definite. He describes scientific management as involving a careful analysis of each unit, and a comparison of each of the smallest steps in the process with an ideal of perfect conditions. The system means, he says, that before anything is done, it must be determined what shall be done, how it shall be done, and what it shall cost. Planning in advance, he explains, is the essence of the new system. It affords a stimulus to workmen in the form of a higher rate for greater output. It shifts the burdens of management from employe to the management, where they belong. It demands universal preparedness, full and complete records, and the ascertainment and application of the best attainable methods, practices, tools and machines; and it means further that all tools, machines and appliances shall be properly standardized and in perfect condition.

This summation is admirable so far as it goes, but it is incomplete. The features which fail to get mention are very important and probably are those upon which Mr. Taylor would place strong emphasis. Nothing is said about the long time required for patient and careful study in the introduction of the Taylor system, nor its delicacy of adjustment, calling for thorough and painstaking effort. There is no reference to the difficulty of finding exceptionally skilled experts to specialize in the new field of transportation. The number of such experts is exceedingly small. These omissions in setting forth the scope and plan of scientific management are of serious consequence, since the public is only too ready to believe in new treatments, and as a result a swarm of unqualified or imperfectly qualified "physicians" is already appearing. The railroads are continually importuned to adopt schemes or devices which their originators believe will bring large returns, but which are obviously impractical or are likely to be vitiated in experience by some fatal defect. After many experiments of this kind, the railroads are naturally wary or skeptical. It is of the greatest importance, both for the railroads and the system of scientific management, that a clear distinction be made between the genuine thing and the poor copy. Amidst diversity and disagreement of doctors, railroad men, with large responsibilities, may well hesitate and insist upon proof before accepting the new doctrine.

To what sources may they turn for this proof? Unfortunately, a convincing demonstration, either affirmatively or negatively, is yet to be made in railroad operation. Only in textile mills, printing and binding concerns, and other manufacturing establishments, is there ample proof that scientific management is both practicable and profitable, that it has increased output and at the same time decreased cost. The testimony before the Interstate Commerce Commission is replete with concrete illustrations of substantially increased net returns, notably in the cases of the Yale & Towne Company, The Link Belt Company, Tabor Manufacturing Company, Brighton Mills and Plimpton Press.

The only instance of the application of something similar to the Taylor system in railroad operation is the experiment made on the

Atchison, Topeka & Santa Fe Railway in 1904-07 by Mr. Harrington Emerson, president of the Emerson Company of New York, who are standard practice and efficiency engineers. Mr. Emerson is the author of the inspiring book, *Efficiency,* and an earnest advocate of advanced methods of securing efficiency. He has had a wide experience in installing his system in industrial establishments and has devoted much time to developing a plan particularly adapted to railroad shops. The results, as described in articles by the editor of the *Engineering Magazine* and by Mr. Emerson himself in several articles and lectures, indicate on their face that the workings of the new system were remarkably successful. In selected items of expense and unusual units of cost, large savings are shown. In one minor item, the maintenance of belts, astonishing results were achieved by more scientific treatment from workmen to purchasing agent.

It will be remembered that Mr. Emerson was the authority for the statement that the railroads, by the adoption of scientific management, could save a million dollars a day. While it is not clear from his testimony before the commission, Mr. Emerson has stated elsewhere how he arrived at his estimate of a million a day. He took the last statistical report of the Interstate Commerce Commission and applied to each grade or class of employe and cost of materials the percentage of efficiency obtaining in railroad operation at this time, according to his observation and judgment. Thus he ascertained what it would have cost to run all the railroads at 100 per cent efficiency. He believes, for instance, that shops are but 60 per cent efficient; section forces, less than 50 per cent; station men, 60 per cent to 80 per cent. Applying the same process and reasoning to the cost of materials, he estimates, for example, that fuel consumption is but 50 per cent efficient. It requires an average saving of approximately 23 per cent in *all* items of expense to reach a million per day. If the saving applied only to the accounts specifically referred to, namely, section forces, shops, fuel and freight stations, it would be necessary to reduce each of these by 50 per cent. In either case, the operating ratio must be cut down from 66 per cent to 51 per cent. The result would be also that 310,000 workmen out of a total of 1,500,000 would be dispensed with.

Since this one example of efficiency methods is held up to the railroads for emulation, it is advisable to call attention to certain conditions, not emphasized in the descriptions of accomplishments; not with any thought of minimizing the good that was accomplished while Mr. Emerson was with the Santa Fe, but to explain why the results of the experiment are not convincing.

In the first place, the new system was introduced in the Santa Fe shops just after the collapse of a lengthy strike of machinists. Shop forces were demoralized and maintenance cost abnormally high, because of the inevitable employment of incompetent men to take the place of the strikers. A return to normal conditions, under any system, would have shown a marked improvement when results were compared with the former abnormal period.

In the second place, the introduction of high-speed steel for tools for cutting and drilling was coincident with the installation of Mr. Emerson's system, although not one of its distinct or unique features. High-speed steel was in general use before that time in other railroad shops; in fact, railroads were among the first extensive users of Mr. Taylor's invention. It is certain that the Santa Fe would have adopted the new tool steel, as other roads had already done, even had Mr. Emerson's system not been adopted. Mr. Taylor's new steel revolutionized the art of cutting metals and very much reduced shop costs. A large part of the Santa Fe saving, therefore, was due as much to high-speed steel as to the new system of management.

In the third place, Mr. Emerson's usual method of expressing the expense of locomotive maintenance is in cost per "road unit." This is an unusual and misleading average because it includes the weight of the locomotive as a factor and assumes that the repair cost varies directly with the weight. It assumes that an engine weighing one hundred tons will cost twice as much to repair as one weighing fifty tons. This assumption is not entirely incorrect; it is true that a heavy engine costs somewhat more to maintain than a light one. But the cost of repairs does not vary directly with weight. In this case, Mr. Emerson's unit gave a favorable showing to the new system, because of the purchase of a large number of new and heavy locomotives during the first two years under his regime. Naturally, the new engines did not call for the same measure of repair work as the older ones, which had kept up the cost in the previous period with which the comparison was made.

The unsatisfactory character of the ordinary accounting unit, "cost of repairs per locomotive mile," is recognized. Yet, with a knowledge of conditions, it is a better index than the Emerson unit, which assumes that cost varies directly with weight. The most reliable indication of cost of maintenance is afforded after all by the "per mile" and "per year" figures in the annual reports. In the figures tabulated below, comparison is made between the Santa Fe and the Union Pacific, running through similar territory to the north, and also the Southern Pacific, running through similar territory to the south. It will be noted that the Santa Fe costs have been steadily higher since 1903 than those of either of the Harriman lines. Taking the average of the seven-year period following the introduction of the new system on the Santa Fe (1904-10), its "per mile" costs are 20 per cent higher than the Union Pacific and 14 per cent higher than the Southern Pacific.

Cost of Locomotive Repairs and Renewals.

	Per Mile			Per Locomotive		
Year	Santa Fe	Union Pacific	Southern Pacific	Santa Fe	Union Pacific	Southern Pacific
1903	9.97c	10.39c	8.62c	$3,042	$3,590	$3,289
1904	13.42	11.23	10.33	3,772	3,565	3,588
1905	14.87	11.56	11.23	4,165	3,791	3,473
1906	11.08	8.61	11.26	3,101	3,068	3,531
1907	10.50	8.66	10.48	3,037	2,933	3,563
1908	13.74	10.70	10.79	3,714	3,108	3,234
1909	11.95	11.50	11.85	3,133	3,149	3,182
1910	12.87	11.72	11.63	3,832	3,656	3,551

In his testimony before the Interstate Commerce Commission Mr. Emerson referred to the time taken to give a locomotive shop repairs. By his system the time was reduced from sixty to thirty days. To the uninformed public this would seem a gratifying accomplishment. But even thirty days is too long. Many of the railroads do better. On the Chicago & North Western, for instance, the average is fifteen days. In this case again the improvement is relative only. The final results are no better than the average of other roads, nor as good as those of roads which are very well managed.

Since the Santa Fe experiment lacks convincing proof, the railroad manager must turn to the records of the manufacturing establishments where scientific management is known to be eminently successful. The impulse of the railroad man, as well as of the manufacturer, is to acknowledge the benefits of the system elsewhere, but to doubt that it can be successfully applied to the complex details and difficulties of *his* business with which the efficiency experts cannot be intimately acquainted. His first answer usually is, "This may work elsewhere, but not in my plant." But open-minded railroad men, while admitting that they may be giving a stereotyped objection, and that in the course of years some roads may find features of value in the system of management thus rudely brought to their attention, may nevertheless urge with good reason that especial difficulties stand in the way. The success of scientific management in commercial undertakings does not in itself prove that the new system would be equally effective in railroad work. The essential differences between railroads and manufacturing establishments must be borne in mind. These differences may be summarized under four headings: (1) area and extent of activity; (2) nature of product or output; (3) relations with the public and the Government; (4) relations with labor unions.

(1) The differences in area and extent of activity are obvious: the manufacturing establishment with its concentrated forces and intensive activity; the railroad with its long lines of communication, scattered units of organization, and extensive range of action. Railroad forces, spread out thinly over the line, necessarily work under scant supervision. Section forces, station men, signal and repair men, car inspectors and oilers, work train and way-freight crews, and many other employes located in small groups at intervals of two or three miles, must be left largely to themselves, and their work checked chiefly by inspection. It is obviously impracticable to afford the constant supervision which is such a vital part of the new system. In a manufacturing plant thousands of men may work in one group of buildings, subject to the supervision not only of gang bosses and foremen, but also of all officers and owners of the establishment. In contrast, compare the one item of section forces. Gangs of six to ten men are scattered over every section of three to ten miles, the average being one man per track

mile. This attenuated line of two or three thousand laborers on a double-track road, say, from Boston to Chicago, a distance of more than a thousand miles, could be concentrated on one acre in a textile mill.

(2) With respect to the nature of product or output, there are also distinct differences between an industrial establishment (such as the Tabor Manufacturing Company), with a uniform output, and a railroad repair shop, where there is little uniformity in the work. The cost of the work in a railroad shop is a small part of total operating expenses.* Shop and repair work is *incidental* to the main function of producing transportation. The value or efficiency of railroad shop work depends upon how well it assists in the safe and expeditious movement of passengers and freight. It cannot be systematized to the same degree as in manufacturing shops, where the character of the work varies but slightly. Oftentimes, too, it is much more important that railroad repair work be done quickly than at the lowest possible cost. This feature applies particularly to repairs made at the engine houses and outlying car inspection points.

In railroad shops which carry on the manufacture (as well as the repair) of locomotives and cars, it would be practicable to adopt a large part of Mr. Taylor's system. But such shops are relatively few in number. The great majority of the railroads find it cheaper to purchase their rolling stock, because the best use of the railroad shops and the mechanical department organization is to maintain, not to manufacture. It has been found that they cannot compete on even terms with an industrial concern which specializes in manufacture.

(3) Quite apparent, also, are the dissimilarities between railroads and private concerns in their relations to the public and governmental regulating bodies. A railroad is a public service corporation. The public rightfully demands that adequacy of service shall outrank the payment of dividends. A manufacturing establishment exists solely for profits. If it ceases to be profitable, it may close its doors or change the nature of its business. The operation of an unprofitable road must continue. It has two functions, public service and profit making; it may not neglect service to favor profits. Necessarily, therefore, methods are em-

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*The cost of maintaining locomotives and cars averages about 18% of operating expenses.

ployed in the interest of public service even though they involve economic loss, and would not be resorted to if railroads were operated as private industries.

For example, paralleling lines, trolley competition, or other changed conditions may make certain divisions, branches or trains unprofitable; yet satisfactory service must be continued, with little thought of returns. The losses from such divisions, branches or trains are perforce absorbed in the earnings of the trains which are better patronized. Again, the demand for prompt and regular movement of freight often results in cars being moved with a light load. If they were held for a full load, the regularity of the service would suffer. As a result only one-third of the capacity of freight cars is utilized.* In other ways economies in railroad operation could be brought about at the expense of the service; but these are desired neither by the railroads nor the shippers.

The effect of governmental regulation is much more apparent in railroad operation than in private industries, and, while both proper and desirable, it adds to the cost of operation. Mr. Howard Elliott, president of the Northern Pacific Railway, recently stated that the cost to the railroads of the United States for board and commission control amounts to $85 per mile of road per annum, an aggregate of $20,000,000. This regulation affects nearly every detail of operation. Though justified by public policy, and apparently necessary to keep *all* the railroads up to a standard which the well managed might adopt without governmental requirement, it has an important bearing on any comparison which may be made between railroads and manufacturing establishments not so circumscribed.

For the safety of trains, again, every precaution must be taken to avoid accident. Methods which might reduce costs but which would also add to the element of risk are necessarily barred. For that reason certain classes of work are performed under day rates rather than by piece work. It is more important to have the task well done than to make a slight saving in cost. One accident as the result of such apparent economy would offset the savings of a long time.

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*The average capacity of freight cars in the United States is 35 tons. The average ton miles per loaded car mile is 19.3.

(4) Perhaps the greatest barrier to the introduction of any system designed to accomplish savings which will diminish the number of employes is the labor organization. Practically every branch of the railroad service is strongly organized and militant. The manufacturer has his labor problem also; but he can close down his plant or lock out his men if he sees fit. With railroads, resistance to demands considered by them as unreasonable must not be allowed unduly to affect service. Trains must be kept moving at any cost, and if men cannot be had to take the place of striking employes, or if, before a strike is declared, it is plain that resistance is useless, the company must make the best terms it can, and maintain peace.

Any system or contrivance, which has for its object the creation of competition among workmen, or which will cause them to exert themselves, is repugnant in principle to labor leaders. Its direct result, as they see it, is to ‘‘speed up,’’ and to lessen the number of workmen. Their attitude is indicated by the strong opposition of the Brotherhood of Locomotive Engineers to the introduction of the Mallet compound locomotive. This type of machine is capable of handling very much heavier trains, but calls for no more effort and very little additional skill on the part of the engineman. The organization held out strongly for double pay, on the theory that the Mallet engine does twice the work of an ordinary engine and, if ordinary engines were used instead, double the number of enginemen would be necessary. The issue came near precipitating a strike on all the western lines last fall, but was finally settled by mediation under the Erdman Act, the enginemen receiving a bonus of $1 per day over the highest existing rate, instead of double pay as demanded. This settlement, however, will hardly be permanent. Opposition will probably continue and the question will undoubtedly cause friction in future negotiations between the railroads and their enginemen.

Of similar significance are the organized efforts of conductors and trainmen to prohibit double-heading. By this is meant the practice of running two engines on a freight train so as to increase its length. The resulting decrease in the number of trains and the consequent smaller number of train crews are opposed by the men.

The year 1910 saw the successful culmination of an ambitious plan to "standardize" the wages of conductors, trainmen, and yardmen in the eastern states, that is, to set a uniform rate per day, per hour, or per mile for each class of service, regardless of local conditions.* The road with the highest wage scale (the Baltimore & Ohio) was selected as the battle ground, and the entire forces of the train-service brotherhoods focussed upon it in a demand for new and unreasonably high rates. To prevent a strike, the railroad invoked the aid of the Board of Mediation (under the Erdman Act), and the award, while not granting the rates demanded, carried with it substantial increases over rates already considerably higher than those of other roads in the East with distinctly different operating characteristics. The new basis was then in turn forced upon practically every road in eastern territory. The increases in New England averaged between 20% and 30% and in some cases exceeded 50%. At the same time long-standing differentials between different grades of employes were seriously disturbed. Throughout, the new wage basis and working rules (prescribed partly by governmental mediation) are far from scientific or equitable.

At this writing (April, 1911) the boiler makers of the New York Central lines have been on strike for ten weeks because of the introduction of piece-work rates at Collinwood, Ohio, on the Lake Shore Railway. Undoubtedly, former abuses of the piece-work basis have much to do with the determined opposition to its introduction in this case. Yet the same opposition would probably have occurred if it had been the Emerson bonus plan used on the Santa Fe. In fact, the head of the strongest organization in railroad service is reported as having said that the bonus system and his organization could not exist together on any railroad.*

These difficulties, serious as they are, may be met by experts. But the railroad man sees no definite plan for the application of the new "principles;" and he has a fondness for the concrete. After studying scientific management as applied to shops he realizes that when similar efforts are made to extend it to the whole line of railroad operation, long and expert study will be needed, and new and unsuspected modifications of the system must be made to meet the exacting conditions of railroading.

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*See a paper by the present writer on "Standardizing the Wages of Railroad Trainmen," Quarterly Journal of Economics, November, 1910.

*Warren S. Stone before the National Civic Federation, January 12, 1911.

The technical record of railroads in the United States is creditable. They have had to meet exceptional difficulties. In their effort to keep pace with the commercial development of the country, a policy of expediency has in many cases justified standards of construction, maintenance, and operation which would have been considered faulty in an older country, like England, whose railroads came after, not before, her industrial growth and dense population. But in the past two or three decades many deficiencies have been corrected and the work of eliminating other imperfections is progressing.

In the interest of a clearer understanding of the situation by the public, it would have been worth while for the railroads to offer more of constructive evidence to show that although scientific management, as a system, has not been adopted by them, yet the principles of sound business management have free play in a large number of shops and other railroad operating activities. So far from being ignorant as to costs, many roads have statistical departments which compile and disseminate information upon every detail of operation, so that each unit of efficiency may be compared with other units, or with the same unit of another division, another railroad, or another period. Instead of being out of date in shop equipment, or behind the time in shop practice, they are, on the average, in advance of manufacturing establishments. They might have shown further that railroads, while far from perfect, are constantly improving in efficiency; that railroad officers, both of the so-called ''practical'' school and those who are graduates of colleges and technical schools, are earnest in their effort and have ample incentive to operate economically. Railroads believe in and practise the free and frequent exchange of ideas by associations and clubs which include every branch of the service. In fact, they are unique in having so few secrets concerning operating methods, and in their willingness to tell of, hear about, and profit by their mutual experiences.

As an illustration of the work of one association, witness the monthly reports of the Car Efficiency Committee of the American Railway Association. The statistical exhibit, showing every detail of operation and revenue connected with freight movement on every railroad in the country, is a convincing example of the scientific thoroughness with which such information is compiled and distributed for mutual benefit. Every department has its association doing similarly scientific work. As other instances, take the Railway Engineering Association and its careful studies and experiments in perfecting rail design and cross-tie preservation; the Master Car Builders' Association and its exhaustive tests of air-brake apparatus; the Master Mechanics' Association and its painstaking efforts to evolve a perfect super-heater and mechanical stoker; and the Railway Signal Association and its thorough-going work of standardizing the art of signaling.

There may be ground for the impression that railroads are in a class by themselves in an attitude of self-sufficiency, that is, a belief that they can learn little from the experience or ideas of those outside the railroad circle. Yet that this is not altogether true, and that the railroads not only welcome but seek assistance from outside experts, is shown by the establishment of the Bureau of Explosives. This bureau was organized under the auspices of the American Railway Association about five years ago by Colonel Dunn of the ordnance department of the United States army, working closely in conjunction with the late Dr. Dudley (then chief chemist of the Pennsylvania Railroad) and a committee of other railroad officers from different sections of the country. The American Railway Association realized that they did not have a man within their ranks with the same wide knowledge of the characteristics of explosives and the best manner of handling them, and were glad to secure Colonel Dunn's valuable services. He has accomplished much in organizing a system and formulating rules of inspection which have reduced to a very large extent the accidents formerly frequent in the transportation of this dangerous class of freight.

In the committee work of the Railway Engineering Association, Master Car Builders, Master Mechanics, Signal Engineers, and other railroad technical associations, the co-operation and active assistance of outside experts is sought. There are eleven university professors on the various committees of the Railway Engineering Association. In the active work of the railroad mechanical associations there are as many more, notably Dean Goss of the University of Illinois, Professor Hibbard of the University of Missouri, and Professor Benjamin of Purdue University.

The railroad man, knowing how keen is the anxiety of his profession for improvement and vigilance, has been and is proud of the achievements of American railroads. He believes that railroad efficiency is higher than the average in manufacturing establishments, and can hold its own with any line of enterprise in the United States. He thinks, too, that in the recent rate hearings the railroads should have been measured not with the exceptional industrial establishment, but with the average. He recognizes, none better than he, the existing deficiencies in railroad management; but that they are greater or more flagrant than those in other large undertakings he will not admit. The extended area of railroad activity and the problem of adequate supervision make it difficult to secure high efficiency and use of materials. The tendency of labor union policy is increasingly to trammel the manager. He is also hampered by the difficulty of securing competent men in supervisory positions. Expert knowledge is not required to point out losses and inefficiencies. They are apparent. But criticism should be accompanied by practical remedial suggestions.

The history of American railways shows that their progress has been steady and substantial. A comparison of any two periods ten years apart will reveal impressive increases in efficiency. The net train load, for example, has increased nearly fifty per cent in the last ten years. Such advances in nearly every case have been the result of development and improvement of existing methods and facilities. The new and improved have been the adaptation of the old. And judging by this steady improvement in the past, it may be expected to continue in the future.

The solution of the problem of how to effect further economies and yet maintain good service seems to lie in a more rigid application of the railroad's own kind of scientific management and a continuation and enlargement of the best practices of the best railroads, so that the operating results of the least economical may approach those whose efficiency is marked, and these in turn set new and higher standards. *A new system is not needed so much* *as a more determined, and a more general application of the sound and business-like methods which have already been found effective in railroad work.*

After all, there is little essential difference between the aims and accomplishments of scientific management as advocated by the new experts and scientific management as practised by the exceptionally well-managed railroads. As a system, it means a careful study and analysis of each element of operation, and the application of the methods best adapted to bring about the best results under the given conditions. Many railroads are doing this successfully; others are doing it in part. In the nature of things, however, their efforts have been directed more to the "high spots" or to those features of operation which are most in need of correction or which promise the largest or quickest returns. Scientific management, as a system, takes a broader view and requires that the same careful study and treatment be given to every detail of operation as is given, say, to the subject of train loading. Obviously, there is a point where this would be unprofitable,—where the cost of the system would exceed the saving.

The real difference, then, between the efficiency experts and the railroads in their conception of scientific management is not in kind but in degree. To find a common ground means mutual concessions. On the part of the efficiency expert it will require less stress upon "system," "principles," "dependent sequences;" it will require more knowledge of the practical problems of railroads, more respect for what the railroads have accomplished, and less exaggeration and generalization concerning waste and possible savings. On the part of the railroad a more receptive attitude is needed for suggestions from the outside and a recognition of the fact that, notwithstanding commendable progress in operating economies, much yet remains to be accomplished.

Among the important features of Mr. Taylor's system of shop management, the principle of time study might well become a part of the practice of any railroad shop with a piece-work basis. The piece-work schedules of today are generally an evolution from "cut and try" methods. Their defects are recognized. Mr. Taylor's second principle, of standardized conditions, is equally important, and many railroad shops come reasonably close to standard practice.

But apart from shop operation, other and greater avenues of economy are being earnestly studied. The delays and red-tape obstruction to local initiative,* will yield to some plan of decentralizing authority, such as is now being tried on the Harriman lines. There are undoubted economies in further standardizing of equipment and materials, as well as in improved methods of storing and distributing supplies. There is promise of economy in the experiments now being made by the American Railway Association in clearing-house accounting for joint use of cars. A substantial saving in fuel may be made by a more general adoption of the methods of the roads having the best fuel records. And throughout the service there is crying need for more and better supervision.

Better supervision calls for better men, and to that end the educational activities of the railroads should have wider scope and more effective organization.* A system of management is not needed so much as managers. The system is not as important as the man. A good system will not altogether save a poor manager, nor will an imperfect system altogether hold back one who is ambitious and able. Mr. Taylor himself recognizes this in his statement, ''the first object of any good system must be that of developing first class men.''

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*Mentioned by W. M. Acworth, the English economist, as a defect in American railroad organization. In the same statement, made on the eve of his departure February 1st last, he expressed surprise that the newspapers should give so much space to criticism of railroad efficiency. In his opinion American railroads are the most efficient in the world. He believes that the skeletons in the railroad cupboards have all been buried and that now the roads "would do well to open their cupboards and let the public see how sweet and clean they are."

*J. Shirley Eaton, in "Education for Efficiency in Railroad Service" (1909), says: "In the course of railroad development, there was a first era, which was the era of railroad building. Any railroad was better than a wagon road. There was next an era of co-ordination of the railroad service and finance to the commercial and financial conditions as a whole with which the railroads were called upon to deal. This was the time of the traffic organization and railroad consolidation. Next came the era of internal adjustment on the physical and mechanical side—perfection of machinery, cutting down grades, strengthening bridges, increasing the train unit. And now has come the sociological adjustment. The human part of the machine is quite as vital as the steel and wooden part in producing efficiency, and so in increasing the income."

Except in the important particulars of time study and functional foremanship, the system advocated by the experts and the system practised by the railroads are not very far apart. Both have for their object that which is desired by the railroads and the public,—ability to give good, safe and economical service. And if achieved either by an improvement of present methods, or by an adaptation of the new system, private management of railways will have strengthened its claim to continuance.

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LIGHT FROM SIR HUBERT.

Who do you suppose said this?

"Today efficiency in management is in danger of being punished, whereas it should be rewarded. Efficiency is naturally reflected in large net earnings; and as no ready means exist for determining whether greater net earnings are due to greater efficiency in management, or to higher rates, large earnings are frequently accepted as evidence that rates are too high, and invite a demand for reduction; whereas, in fact, the large earning may be due wholly to better judgment, greater efficiency, and economy in administration. To take from railroad corporations the natural fruits of efficiency—that is, greater money rewards—must create a sense of injustice suffered, which paralyzes effort, invites inefficiency, and produces slipshod management. * * * Private capital embarked in a quasi-public business ought to receive compensation on a sliding scale, so that the greater the service to the public, the greater the profit to those furnishing that service. We should endeavor to approximate results similar to those obtained in Boston by applying the sliding scale system to the production and sale of gas. There the dividend to the stockholders rises as the selling price to the public is reduced."

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Why Mr. Louis D. Brandeis before the Railway Securities Commission.

HOW IT APPEARS TO THE EMPLOYE

From the Railroad Trainman.

The Review of Reviews for March explains in an article written by Mr. A. W. Shaw, what is meant by scientific management, which is the means to be adopted to make the workman more valuable to himself. His definition is as follows:

''By a system of records it determines the workman's special capacities that permit him to be set at the work at which he is most proficient and by means of a bonus system it provides for the adequate remuneration of the worker, not on the basis of effort expended but upon the more modern basis of effort practically applied and expressed in units of production. As a consequence the workman's value to himself and to the employer is increased as rapidly and as highly as his capabilities will permit.''

This reads splendidly, but the experience of employes will not create any degree of enthusiasm on their part for a change in the methods affecting their employment. The entire piece-work and bonus system is based on what the high-capacity, physically perfect man can accomplish. His strength, his superior skill in his trade, or his willingness to overexert himself to the detriment of his mental and physical well being, regardless of their effect upon his fellowmen, are accepted as the basis for general capacity. The employes have had to fall back on the establishment of the minimum wage, efficiency of the average man, and have had to get away from a sliding scale based on the performances of the extra efficient who, if let alone, inaugurates a sweatshop system whereever wages are based on piece-work and the bonus plan.

Scientific efficiency can be explained in a very few words by one of its most ardent admirers, who said that it means ''Scientifically selecting, developing and teaching the worker so as to get the highest grade of efficiency out of him.'' He said a number of other things calculated to make the worker believe that scientific efficiency was the only way open for his salvation as a wage earner which can be taken with due allowance because it is prompted by the personal interest of the employer.

At a meeting of business men in Philadelphia recently, examples of what is meant by scientific management were quoted One of them was as follows:

"The burden or responsibility assumed by the management is that of scientifically selecting, developing and teaching the worker so as to get the highest grade of efficiency out of him and to give to him the highest degree of personal prosperity.

"The next task for the manager is to bring together the science of the business which has been developed and the workmen.

"Again the management does a vast amount of work which it never did before and takes it from the workman. The old idea of the slave driver is abandoned and there is substituted an intimate co-operation between the management and the worker.

"An illustration was given of an establishment where 126 girls were employed to select bicycle balls. The speaker said, 'They worked 10½ hours a day and when I proposed that they vote on whether they should cut the day down to ten hours, they all voted against it. Pretty soon we had them working eight hours a day and doing the same amount of work.'

"We found that the one essential in their work was a low personal coefficient, or a quickness of the mind to respond to an impression. By determining which girls had the low coefficient we cut the force down to thirty-five girls working 7½ hours and doing the same amount of work that the 126 girls had been doing. Furthermore, the thirty-five girls were given other work and they earned twice the amount of money they did before and were turning out more than twice the work."

This is from the view-point of the employer. A little story entitled, "The Piece-Worker," was written by Miss Mary McDowell, some time ago, from which we quote, as an answer to the promising reference as to what efficiency and the bonus rule mean to the employe. Miss McDowell undoubtedly takes her story from the actual life of the employe. She said:

"* * * * In an atmosphere heavy with turpentine she painted, lifted and piled thousands of these cans a day in order to earn the average of twelve dollars a week which her expenses required. With her deft fingers she soon outstripped the others and thus set the pace. The rest were urged and goaded to keep abreast with her. This won for her the hateful name of 'Pacemaker.'

"They did not realize that her pace and her pay were part of the great machine that never ceased its dreadful pressure. There had been a time when the girls were given a few minutes for lunch in the middle of the morning, but now even that was not permitted. From five o'clock in the morning it was paint, paint, paint through the long ten hours. Nerved to a tension that only a machine could endure, the fingers flew faster and faster till the eyes grew dull and the brain dizzy. With the tongue thick with the taste of paint, food and drink were impossible while in the workroom.

"Just as Mary's goal of twelve dollars a week seemed a surety there was a sudden cut in the wages. No explanation was given. Helpless, unorganized, with no power to enforce their demands, there was nothing left but to start again. With redoubled effort, because it now took twice the number of cans to make the weekly income, Mary's speed again reached the twelve dollar goal, but many fell back to an eight dollar and even a five dollar limit.

"Then a second cut was made. 'The girls were wild,' Mary said, when she told me. 'They kept saying, "It ain't fair. We won't stand for it. We'll walk out. Ain't we been painting their fourteen-pound cans like machine creatures, and what good has it done us? We've got to have day's work." But we couldn't do anything,' Mary added, quickly, 'except get mad and quit, because we had no union.'

"It was Mary's last cut. The pacemaker's race was finished. One day she fainted from over-exhaustion and they carried her home."

This is what stands for "efficiency" in most employments.

Another reference of the speaker, at the Philadelphia meeting, was to the scientific management of labor at the Bethlehem Steel Company's plant. In regard to it he said:

"As to the art of shoveling, for it is an art, the important thing to determine in shoveling is the proper shovel load.

"We put teachers over the men to show them the art of shoveling. In that yard the force of 600 men was cut down to 140, wages went up from $1.15 to $1.85 and the company was saved between $75,000 and $80,000 a year."

Here is a division of profits and work that shows what efficiency means to the man.

It will be remembered that only last year the employes of the Bethlehem iron works struck on account of the exacting rules of service, long hours and inadequate pay for the work performed. Investigation was conducted by a most reliable board of investigators that brought out the severest direct censure against methods of employment and the treatment of men that have been delivered against a corporation since the day of the murder of the steel workers at the time of the Homestead strike. It proved absolutely that scientific management so far as the men were concerned was absolutely unfair, that it took advantage of the employes generally to the extent that a general strike was ordered which was a protest against the conditions of employment as in operation under this "efficient" system of management.

No one who has not been employed in the larger industries that are demanding the scientific plan of employing labor can realize what it means. They do not understand the mental and physical exactions made upon the men, nor do they realize the disappointment and despair that are a part of the job of every responsible employe in the large industries in this country. They do not know that employes are worked to the limit, that regardless of the rules for their protection they cannot take the time to observe them. They do not know, because these things are skillfully covered up, that the man cannot spare the time to obey the rules laid down for his protection, because, for him to do so would suspend for a brief period the work of his fellow employes who would resent any interruption that would mean a loss of wages to them.

A story in *Everybody's Magazine* for March, entitled "The Cog," by James Oppenheim, while a story, is unquestionably written with an accurate knowledge of the subject. We quote a part of it and it will not take a vivid imagination to supply what has been left out. The story is of a steel worker occupying a responsible position, overworked through the demands of his mill to pile up extra tonnage within a given time, who wakes from his heavy sleep, ill and physically unfit to perform his duty, but who feels that he dares not stay away from employment because to do so would mean his dismissal. Here follows a part of the story:

"* * * She (his wife, Molly) leaned closer, and spoke her heart out, the words lashing him.

"'The steel mill's killing you. It's the twelve-hour day. Twelve hours a day for a whole week—and then twelve hours for seven nights. Seven nights you don't sleep with me. I never see you more than an hour at a time, and then you're dead tired.' She raised her voice to a quivering cry: 'It'd been better if we'd 'a' been found dead in each other's arms the night after we married, when we knew there was a God in this world! Our children were *damned,* not born!'

"She looked suddenly straight in his eyes, and kept his gaze. Then she spoke in a voice that had lightning in it—that seemed to stab through him like a long needle.

" 'Yes—you and I have lived as if there weren't any God, and you've lost your soul, Richard, you've lost your soul. You can't love any more, and you don't live. You're a cog.'

"His face struggled violently, he opened and closed his mouth. Then he half closed his eyes and snarled: 'Now, you've spoke—and what are we going to *do,* eh?'

"She spoke intensely: 'Strike!'

" 'Strike, eh?' He smote the table with his fist. "Didn't we strike here in Homestead in '92, and wasn't our union busted up good and thorough? And ain't they spies all through the mills, and it's worth a man's job to open his mouth or make a kick? And don't they own us on election day and it's vote with the bosses or quit? Talk's cheap!'—he snapped his fingers. 'But let me tell you, I hold down a thirty-five a week job, and I couldn't earn half that elsewhere. I'm stuck. *They've got me—they've got me for life.* We have a few hundred in the bank, eh? But how long would that last? Do you want me to get a job at ten or twelve per, and live like a Hunk? A cog, eh? Well, what should I do?'

"He arose, one hand pressed on the table. And then the clock slowly struck five. He staggered across the room, picked his hat and coat from a wall-hook and put them on.

"The evening was chilly, making him shiver, and in the smoky air street lamps burned dimly about him. He turned the corner and walked down a street. On one side, at the end of the street, stood the black wall of the mill grounds, on the other the smoke-blackened mill houses, each set in a cinder-dead soil that never bloomed.

"Richard felt sick, utterly sick. He reeled through the smoky air, turned a corner before a library, and crossed a bridge into the mill grounds. Many other men were hurrying with him. As they went on, suddenly their grim faces were splashed by far fires and strange lights. They began stepping over intricate tangles of railway tracks in the yards, and all the time their faces shone brighter. Yet not a man of them took any interest, though all about them was one of the sublime scenes of America. * * * *

"It was one of the most terrible nights of his life. He was sick; he could hardly hold his head straight; and yet he had to have a clear eye, a steady hand, and infinite patience. His gaze never left the hurrying ingot, and he had to gauge its thickness and what it would stand. Each time it drew near it shot over him a consuming heat that burnt and smothered and made the flesh tingle intolerably. Ordinarily he would not have felt this, but to-night he was sick. The glare, too, hurt his eyes and the steel lever got hot under his gloves.

"There was no breathing spell. Ingot followed ingot without pause. He pulled the lever, and then, with the wild 'Klong-a-a-l,' a shower of sparks, a smell of powder, the ingot was squeezed. The speed was terrific and grew worse, for the little foreman had given out the impression that his men must pile up a record and beat the output of the other mills. And the responsibility was what made a man old—for if anything went wrong, if an ingot was spoiled or the mill stopped, the money loss to the workers, as well as to the mill, was very large, for the men were paid by the ton.

"Hour followed hour, and Richard pressed the lever down or pulled it up, his face twisted with the torture of the toil, every nerve, every muscle strained and alert and in action. His head now and then went dizzy and his face paled. Whenever he winked he saw a red ingot sliding back and forth. And worst of all, his heart was in wild and new revolt. He heard the cry of his wife—her words kept beating through his brain. Sick and desperate and struggling, he could not shun the truth. He knew that everything she had said was true. Yes, bitterly true! Look at this machine—it did all the work—he, the man, merely waited on it, pulling a lever for it. That was his life. He was nothing but a cog. It was this for twelve hours, and then a bite, a sleep, and this again. What was he but an animal? Yes, Molly had told him.

"And then, each time an ingot hit the wringer, some phrase went through his head and made him struggle inwardly. Bang—whow—ow—ow—went an ingot!—and Molly was murmuring that he had no soul, that he did not love her. Bang!—and she told him how he had stopped his reading. Bang!—and his friends. Bang! —And he didn't love Molly; how could he—Bang!—He was getting to be an animal!

"On and on it went, the noise, the glare, the heat, the dizzying sickness. Hour followed hour through the terrible night—hour after hour and no end near. His tongue and throat grew parched, and he seemed to be toiling over a sunstricken desert of measureless, dazzling sand, toiling, lifting, sinking, burning. Now and then a shower of sparks leaped as through his brain; now and then the whole room turned red. Now he seemed to be pushing the lever down over the floating face of Molly, and her fearful cry rang through the mill. Now by a mighty effort he saw clearly again—the hovering laborers all sharp and shadowy, the advancing ingot, the gloomy, dark wringer, the menacing heights above him. But Molly kept saying: 'Richard, you don't love me any more—you don't love me!'

"So he gave the lever a good jam. There was a weird, unusual crash, a splutter, and a dozen men roared together. The rolls stopped, and in the queer silence Richard saw clearly again. He had jammed an ingot and broken a coupling sleeve. A sickening horror went through him. It meant the loss of an hour's time. He had tied up the whole mill. And all the other workers would lose in their wages, too.

"All the men of the section came rushing toward him, shouting angrily. And then suddenly the little foreman came dancing up.

"The little fellow swung a fist in Richard's face, and shrieked: 'Damn you—damn you! Just as we're piling up a tonnage record! I'll trim you for this—'

"Then suddenly fifteen years of silent pressure blew off. Demons raged in Richard's heart, his brain went hot. With his powerful hands he gripped the little foreman by the throat.

" 'You damned little pusher,' he snapped, 'go to hell! * * * *

"He turned up the dim street—the house was alight. He stepped around to the rear and pushed open the kitchen door and entered very softly. Molly was building a fire in the stove. She paused, with a stick of kindling wood in her hand, and looked at him.

"He spoke in a queer, suppressed voice: 'I want to see the children.'

"Her eyes grew larger, her lips parted, but she said nothing.

"He pushed open his bedroom door and passed through to the room beyond. He was gone several minutes. When he came back his lips were twitching, and tears were trickling down his face.

" 'Molly.'

" 'Yes.'

"He drew a step nearer. He tried to control himself. He spoke softly. 'I've—been—fired.'

"She stared at him. *'Fired?'* she cried.

" 'Fired! And we're poor as mice.'

"She took a step toward him. *'Fired?—Dick!'*

"She gave a great cry and held out her arms, and drew him close—and closer—passionately hugging him.

"And as he felt her arms about him—tight, tight—her lips pressed to his—her living presence closing with his soul—suddenly, it was as if there was a rip in his heart; love made him tremble, and he murmured:

" 'Molly, I love you again—I love you again!'

"And life was sweet again, and they were poor."

There is more truth in this exemplification of "efficiency" and it comes a little closer home to every man who is employed by a corporation than all of the splendid theories of scientific efficiency and higher wages that are held out by the employer as the only way whereby modern industry can effectively be operated to the advantage of the employer and employe.

The World's Work, for March, 1911, has another story that shows what scientific efficiency demands of the employe and how little regard it has for him as a human being. It is another one of those little stories that without a question of doubt has its basis in the actual living experiences of the persons around whom it is written. This story is called "Down to the Slum," written by Mr. Henry Oyen and it shows in terrible language the descent of the worker, who had enjoyed a fair standard of living, to the lowest depths of social degradation because he could not keep the pace set for him. It is a story of the dead line from the bread line. We quote herewith a few extracts from the story and the imagination of any workman or his wife can supply the missing parts.

“John himself was a good man. He was one of that great majority of men who marry, settle down, assume the awesome task of raising a family without having prepared for the task. Of the things that the world pays money for, he had little to sell. He was not educated. He was not well trained for any profitable purpose. He was not a fully skilled workman, because running a punch-press is mechanical work. But that was what he could do, and he earned as high as $18 a week at it—and it was every cent that he was worth, and he knew it.

“The factory where he was employed is typical of great American plants of its sort. It carries as many as 6,000 people—men, women, boys, and girls—on its payrolls, and is fair to them in most ways. Its buildings are new and well-made, and its machinery and methods are modern and scientific.

“John drew his envelope every week, carried it home, and was at once relieved of it.

“One Saturday night in October, 1908, John came home with his shop clothes under his arm—and the hopes of the family were gone. It was pay-night; John handed Mary his envelope as usual, and said:

“ ‘They let me go!’

“After the children had been sent to bed, he went into details.

“ ‘It didn’t seem as if I could believe it.’ So runs Mrs. Brinkerman’s remembrance. ‘He had been with the company so long that I thought he’d stay there always. But he didn’t. I asked him how it happened, and he said he didn’t know. “I guess I must be slowing up,” he said. “That’s what the foreman said. He called me down yesterday and the day before. He told me that I was the slowest man in the line.” (There was a row of punch presses similar to the one on which John worked. In the shop it is called a line.) “He told me to look at my stock and the next man’s. That man was a speed artist. They put him there to speed us up,” John said, “What’s the matter? I’m running as fast as I ever did.” Then the foreman said, “Well, there are faster men looking for your job.’ ”

“This was strictly true, for the speed of machine operations increases annually, and the speed of men in their prime keeps pace with it.

“John had tried to speed up, but apparently the attempt was a failure. Or possibly it had been decided that John was to go.

At all events, when Saturday came there was a printed slip in John's envelope saying that, owing to the slack season, the shop force was to be reduced and his services were to be dispensed with during this period when there are not sufficient orders to warrant the operation of all machines.

" 'I guess I must have slowed up,' said John. 'They wouldn't have let me go if I hadn't. They kept me through lots of slack seasons before.' "

The writer in referring to the hopeless search for work very properly said:

"He didn't get work. Of the hundreds of similar cases from which this one was selected, the genesis of misfortune is just that —'didn't get work.' It was no accident; it was the remorseless working of a system. John's discharge and the slack season had all been arranged years before. To keep pace with its competitors, the company must get a certain high standard of efficiency from its shop-people. To get it, it must watch the individual closely. It is as if an engineer were constantly testing the cogs on an important machine.

"John had slowed up. For ten years he had bent over machines that ground particles from metals, had breathed the metal dust, and had worked at a speed that used up all that was in him. Such a regime does strange things to the insides of a man. There is nothing apparent to the inexperienced observer. The man looks sound. But, after some years, the foreman's eye begins to detect a failing, and when the first slack season comes it is a good time to discard a wearing-out man. This is not theory; it is business.

These are the effects of scientific management as applied to production. If they are supposed to have increased the prosperity of the employe it is not at all out of place to say he would have been better off without prosperity of the kind that sends his family to the gutter and himself to the pen. It is the story of every day life, of unrecompensed toil, of a young man, old before his time, scrapped and done for and his family down to the slums. And, in the face of it, the employer demands greater efficiency.

Railroad employes are interested in the theory of scientific efficiency, because the railway companies have been advised to observe strict economy in the payment of wages, in the operation of their properties, and so far as we can observe, "scientific" management simply means to add that much more to the tasks of the employe without meaning to in the end add one single cent to his day's earnings. Questions of this kind appeal to gathering of employers who try to make themselves believe that they include their employes in whatever advantages come through scientific management, but they do not appeal to the employe who knows that capital preys upon labor, and that if it discovers or develops a further reservoir of productiveness in labor it will appropriate it and leave labor no better off than before. The railway transportation employes might take some comfort at this time in the statement of the most important witness produced by Mr. Brandeis, who said: "The efficiency of the traffic by my standards is very high, that is, efficiency of expense in the traffic department." The wonder is that anything could have been even imagined to the contrary and, yet, the railroads are now figuring on additional tonnage without additional men to handle it. When one considers the increased efficiency of train operation today, the increase in the number of tons hauled, the decrease in the number of men employed, and everything else taken into consideration, it would have been peculiar for the scientific efficiency expert to have declared to the contrary. The word has gone down the line to many of the shop employes that scientific efficiency is to be the plan of operation in the future, and it is safe to say that it speaks true in very many instances. The reward is promised and doubtless will induce many who have heretofore been regarded as fair employers of labor to take a chance on increasing the productiveness of their employes, not with any hope of bettering the conditions of the employe or of giving the advantage of cheaper production to the consumer, but for the purpose, as always, of adding to their own revenues without considering the physical and mental deterioration of the men, which now seems to have reached the limit of sacrifice demanded by industry.

That there is danger of "rushing" the plan, already killed in the house of its friends, is admitted by *American Industries*, an employers' publication, which said:

"It is no detriment to the real value of scientific management to utter a word of warning against ill considered attempts to adopt its principles. Like all newly discovered, or newly exploited industrial panaceas, many crimes may be committed in its name. There are today undoubtedly scores upon scores of civil engineers out of a job, or shop foremen seeking other jobs, who are about to set themselves up as efficiency engineers, prepared to reduce costs and increase profits at a moment's notice. In that lies the danger of the new movement. The system itself as promulgated by Frederick W. Taylor, after thirty years of arduous, painstaking and costly experimentation, stands on its own bottom as a revolution in practical shop management. Mr. Taylor himself has no faith in the wholesale possibilities of the system, and most earnestly condemns any effort made to achieve results with 'short cuts.' To him there is no royal road to success in the application of scientific management to any plant.''

THE NECESSITY FOR HIGHER RATES

BY JAMES MCCREA,
President the Pennsylvania Railroad Company.

STATEMENT BEFORE THE INTERSRATE COMMERCE COMMISSION, WASHINGTON, D. C., OCTOBER 12, 1910.

Anticipating that I would have to appear before this Commission, I have endeavored to put my conclusions and thoughts down on paper to the end that I might state as clearly as possible and in proper sequence what I had to say. In putting it on paper it was done entirely by myself and the lines of thought are my own. The figures to which I will refer in a general way were furnished me by the Comptroller of the company, who is the proper officer to do that, and while I have not entered into detail at all in connection with them, he will be prepared to submit any statement in detail on which these figures were based. If it please the Commission, I would like to be allowed to read those conclusions, because I think in that way I can more clearly give my views on the subject that I am testifying to.

The testimony that I want to give is that the Pennsylvania system east of Pittsburg has cost very much more than the capitalization represents. On that capitalization it has never paid more than a fair return, less, in fact, than most other characters of investment, such as manufacturing, mining and agriculture. The results of constant increases in its business have been distributed either through reductions in rates, increases in amounts paid for wages and material, or by reinvestments in the property not capitalized. It has always been typical of good and constantly improved service—in fact, the character of service which, if I understand the American people, they desire perpetuated and improved. When a railroad system of this character so capitalized, renders a service which is not only of the highest character, but satisfactory to the public and to its patrons, deriving as it did in the year 1909, net earnings to the amount of but 5.01 per cent of the amount actually invested in the property, it is difficult for me to understand how a system of rates which secures such results can be regarded as on too high a basis.

The Pennsylvania Railroad Company has for many years past, as a result of its operations, realized a substantial surplus in each year over and above the amount required to enable it to meet its interest charges and pay moderate dividends to its stockholders. This surplus has varied in amount from year to year. For the last ten years the average has been about $12,000,000 a year, practically all of which has been expended on the property for the purpose of enabling the company to conduct its operations more safely, more efficiently and more cheaply.

Since the passage of the interstate commerce act in 1887 the amount expended on the property of the lines east of Pittsburg out of the surplus earnings and from other sources than the proceeds of the sale of issues of bonds or stock or other securities, agregates $262,000,000, and the company was enabled to provide almost all of this large sum out of surplus earnings derived from the operation of its property. The Pennsylvania Railroad and many of the roads embraced in its system were built at a time when it was difficult to secure capital for such enterprises. The country through which the roads were built was at that time comparatively thinly settled and the business light. The character of the construction, which was suitable for the time and the existing conditions, was, to a large extent, unsuited to later conditions. The safety of the public and of employes required elimination of grade crossings of highways, the use of safety appliances and the use of improved material and equipment, all of which in themselvs do not yield much, if any, net return, and it was to meet these conditions and to adopt its road and equipment to modern requirements that the uncapitalized earnings in the form of surplus have been so freely spent. Had these earnings not been available, and had they not been expended for the purposes indicated, the Pennsylvania Railroad would today be a very different railroad, and would have been wholly unable to render the service to the public which it is today rendering. The accumulation of these surplus earnings which have been thus expended has only been possible because the rates of freight in force since the passage of the interstate commerce act have been sufficient to realize for the company amounts in excess of its expenses, taxes, interest and dividends.

The fact that these surplus earnings were being earned in each year has not been a matter that has been concealed from the public, but, on the contrary, the existence of the surplus and the disposition made of it have not only been public property, but the method or practice pursued by the company in providing in part, at least, for the necessary additions to and improvement of its property in this manner has been generally and publicly commended and approved.

It is vitally important that in the future the company should be enabled to continue to pursue the policy which has guided in the past, and to provide in part, at least, for future additions and improvements out of surplus earnings. It is fairly to be expected that the company will be required to make as great expenditures in the future as it has made in the past. An enormous amount of work remains to be done, for which additional funds will have to be secured. The public of today is demanding a service of a far more costly character than 10 or 20 years ago was expected or desired, and in order to make the improvements required to meet the constantly increasing demands of this character and to furnish a service which, according to modern views and standards, the public, in a sense, has a right to ask for, large expenditures must continue to be made upon the property, and if this company is to meet these conditions and is to continue to progress and not to go backward (because there is no such thing as a large railroad system standing still), it must continue to derive earnings from its operations, not merely sufficient to enable it to make a fair return to its stockholders, but sufficient to earn a surplus which can be expended on the property sufficiently large to maintain the credit which it has established.

In the last ten years the Pennsylvania Railroad Company has expended upon its property out of income upwards of $116,000,000 and has also secured, through the sale of its stock, exclusive of premiums, to the amount of about $275,000,000, and through the increase of its bonded debt, exclusive of car trusts ($25,000,000) of about $172,500,000. Its ability to sell its stock and bonds has been due to the fact that it has not merely paid dividends of 6 per cent or 7 per cent, chiefly the former, but that it has been able to show at the end of the year large surplus earnings, which it has put back into the property.

When investors have been asked to purchase its stock or bonds the company has been able to show that it was then in receipt of enough income to enable it to make a fair return on the securities that it proposed to issue, even if the proceeds of these securities could not be so invested as to enable the company to derive an immediate return thereon. In other words, the existence of the surplus earnings established a credit which enabled the company to secure the additional funds necessary to make improvements or additions as these became necessary.

What would have been the condition if the company's earnings had been so restricted in the past as to prevent it from accumulating surplus earnings available for the improvement of its property? If the $262,000,000 which has been thus expended on the lines east of Pittsburg had been realized through a sale of securities these securities would have had to have been sold at a price which could have been realized for them, and if the earnings of the company had been such as to barely cover the amounts required to meet its interest and dividends on its then outstanding securities, the prices realized for any additional issues of securities would have been such that the additional charges to which the company would have been subjected would have today necessitated rates higher than those which have been prevailing, in order to enable the company merely to meet its interest and dividend charges.

But there is another feature to be borne in mind in this connection, and that is that a large part of the $262,000,000 thus expended upon the property has been spent for purposes which would hardly justify an increase of its capital. Take, for instance, the amounts expended in changes of line in order to eliminate curves or to reduce grades. In almost all cases of expenditures of this character the old line is abandoned. Take, also, the large amounts which have been spent in the elevation of the railroad through cities and many other items of a like character. Expenditures of this character, which do not result in any additions to the property which would tend to increase its gross earnings or revenue, ought not, where it is possible to avoid it, to be treated as capital expenditures.

During all the period that these large expenditures were being made—mainly out of surplus earnings—one of the main purposes that the company had in view was the reduction in the cost of transporting its business. Throughout this period the general trend of wages has been upward and the same has been true of its taxes and of many other items which enter into and affect operating cost. Increased cost resulting from these features has been largely met by the reduction in cost resulting from expenditures made for this purpose, and thus it has been possible to avoid constant and frequent increases in rates of freight which otherwise would have had to have been made in order to enable the company to meet its increased operating cost.

In the present year the expenses of the companies whose lines are embraced in what is known as the "Pennsylvania Lines East of Pittsburg" have increased, due to an increase in the rate of wages paid to their employes, between $7,000,000 and $8,000,000 per year, and it is necessary for this company in some way to recoup itself for this additional tax on its income. Heretofore in similar cases this has been accomplished partially by advances in rates and partially through economies resulting from reductions in grades, increased hauling capacity of locomotives, increased capacity of cars and increased volume of business.

So far as concerns economies which will result from reductions in grades, increased hauling capacity of locomotives and increased capacity of cars, the companies are today already practically deriving the full benefit from those which are possible in this direction, due to expenditures heretofore made, for we have practically completed our grade reductions and have probably reached the maximum size for our cars and engines. And it is to be borne in mind in this connection that we are now largely unable to secure the benefit of increased economies resulting from larger engines and cars and reduced grades with respect to our preference freight trains, in which the merchandise class traffic as a rule is transported, due to the fact that the amount hauled by these trains is limited by higher speed and the maximum grades over which they must pass, this being necessary in order to avoid the breaking up of the trains at transfer points.

For the last three years there has been practically no growth in business. The records of 1910 will show that the business of that year is below that of 1907. I do not mean that it should be inferred from this that there is not, in my opinion, going to be any future growth in business, but east of the Mississippi, at least in my judgment, it is going to be at a markedly slower rate than in the past, and with that growth will probably come a diminishing length of haul, thereby tending to reduce the gross earnings of the companies. But even if our gross earnings are to continue to grow as the result of growth in business, the additional net earnings that will be derived from the increased business will in all probability fall very far short of making good the additional cost put upon the companies by the wage increase.

That this is true is largely demonstrated by the results of the company's operations for the five months following the advance in wages. In these five months the gross earnings of the lines east of Pittsburg increased about $6,700,000, while the net earnings (including in the expenses expenditures heretofore made for additions and betterments, in order to enable a comparison to be made with last year, when expenditures of the same character were also included in operating expenses) decreased about $3,000,000. Treating these months as typical months—and there is no reason why they should not be regarded as such—and extending the figures so as to embrace a year's business on this basis, the result would be that with increased gross earnings of about $16,000,000, there would be a decrease in the net earnings of about $7,200,000. The results of the five months' operation already referred to have also shown that (treating again the expenditures heretofore made for additions and betterments as part of the operating expenses, in order to enable a comparison to be made), the operating ratio has risen from 69.70 per cent in 1909 to 75.51 per cent in 1910, an increase of almost 6 per cent. There is no reason, in my judgment, for expecting that further increases of gross earnings will tend materially to reduce this operating ratio, except to the extent to which increased rates of freight will tend to do this. The company will therefore in the future be obliged to expend for operating expenses probably not less than 75 per cent of any increased earnings which it may derive, but the 25 per cent which will be thus left will not represent surplus earnings; thus, for example, gross earnings of the Pennsylvania Railroad Company in the year 1909 exceeded those of the year 1900 by about $66,000,000, the operating expenses, including taxes, increased $52,000,000 and the net earnings about $14,000,000.

But in this same period the investment of the company in the property from which this income was derived had increased to the extent of $288,000,000. Interest on this amount at the rate of 6 per cent would be more than $17,000,000, so that of the increased earnings of 1909, which, as has been already said amounted to $66,000,000, $52,000,000 was absorbed by operating expenses and taxes, leaving $14,000,000 net earnings, or $3,000,000 less than the interest on the amount necessary to secure them.

In my judgment, therefore, it would be wholly unsafe to assume that the company will, as the result of the growth of its business, be enabled to recoup itself for the depletion in its surplus revenue which is certain to result from a continuance of the present operating cost. Under these conditions I feel that it is essential, in the interest of the public and of shippers, as well as of the railroad company itself, that it should be permitted to secure through an advance in rates the amount which represents its additional outlay on account of the advance in wages in order that its surplus earnings may continue at approximately the rate at which they have been running in the past. It will require the expenditure of more than these surplus earnings to enable the company to keep pace with the demands of the public and of its shippers, and unquestionably additional capital must be secured in the future. If we are to obtain this we must not only be in a position to make a fair return on it, but we must be able to show a margin of safety in our earnings.

In closing I want to say that, based on my railroad knowledge and experience, I believe, generally speaking, that which I have said in regard to the Pennsylvania Railroad as to the necessity for the rate advance is equally true of almost all railroads in the United States—certainly those which are conservatively managed and which are endeavoring to give the public such a service as they have a right to expect.

RAILWAY GAUGES.

FROM THE *South African Railway Magazine.*

The so-called standard gauge—four feet eight and one-half inches—is, of course, based on the gauge of the early English railways, but up to the present time more than twenty other gauges have actually been adopted. Of these other widths, the five foot six inch gauge is by far the most widespread. This gauge has been used on about 34,560 miles of railway, whereof about half is in India, a quarter in Spain and Portugal, and the other quarter in the Argentine and other South American countries. The gauge of the main Irish railways is a little less, being five feet three inches. According to recently published statistics, 14.5 per cent of the world's railways are on the broad gauge, that is to say, have a wider gauge than four feet eight and one-half inches; 71 per cent have the standard gauge of four feet eight and one-half inches, and 14.5 per cent are on the narrow gauge. The following table shows the proportion of the mileage of the gauges in different parts of the world:

	PERCENTAGE.		
	Standard	Narrow	Broad
Europe	71	7	22
North America	98	1.99	0.01
South America	14	50	36
Asia	7	50	43
Africa	17	83	—
Australia and Australasia	20	58	22

The majority of the European broad gauge mileage is represented by the Russian railway system.

NEEDS OF THE RAILWAYS

Two Addresses by Chairman Martin A. Knapp of the Interstate Commerce Commission.

(1) BEFORE THE TWENTY-SECOND ANNUAL CONVENTION OF THE NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS AT WASHINGTON, D. C., NOVEMBER 15, 1910.

"Mr. President and Gentlemen: On behalf of the Interstate Commerce Commission, it gives me very great pleasure to welcome the members of this association, who have come to Washington to attend its twenty-second annual convention.

"It is difficult for me to realize that it will soon be twenty years since I attended the third annual convention of this association, but I have not forgotten the impression then made on my mind—for I had just been appointed to this commission—by the memorable address delivered on that occasion by Judge Thomas M. Cooley, then and from the first its presiding officer. He was a very great man, a jurist of extraordinary and versatile ability and a student of the railroad question, as profound and as intelligent as any man of my acquaintance who has given consideration to that great subject. It was, I think, his last public utterance, for he left shortly afterwards for his home in Michigan and failing health prevented his return. Nor could I find more befitting words or a more appropriate sentence for this present hour than the opening paragraph of that opening address. He said:

" 'Our purpose on coming together on this occasion is for consultation upon subjects of mutual interest, and for the discussion of questions which either pertain directly to official duties we have severally taken upon ourselves, or which, at least, have some bearing upon the proper performance of these duties. We are not all clothed with the same powers; there has not been prescribed for all of us the like obligation; but in our official actions we all have the same general purpose in contemplation, and it may justly be assumed that the views we severally hold will be of common interest, and that in so far as there has been any experience in dealing with practical questions, that experience will not be interesting merely, but of high value.'

"Great changes have been made since that address was delivered. The country has grown marvelously in numbers, in wealth, and in power. There were then only a little over 161,000 miles of railroad, now about 240,000, an increase approaching 50 per cent, while the gross revenues of the railroads have leaped in that time from a little less than $1,100,000,000 to the enormous sum of over $2,850,000,000. There were then only 22 states having railroad commissions or regulating bodies, and now, I believe, there are 42, which is some indication not merely of the rapid growth and wonderful development of our transportation systems, but of the firm hold which public regulation has taken upon the judgment and sentiment of the American people.

"It is easy to see that great progress has been made in the task which has been committed to our hands, and I have this encouragement, that when I contrast the methods and practices which were characteristic, if not universal, a score of years ago with the methods and practices which generally obtain today, I can see an immense advance toward right conduct and impartial treatment of the public. Quite as significant as this, to my mind, is the altered attitude of railroad managers toward the whole subject of public regulation; that whereas it was then opposed, belittled, obstructed, it is today, if I may not say welcomed, at least conceded to be a public necessity.

"But I am not altogether persuaded that the scheme of public regulation has passed the experimental stage. I do not forget that older countries than this, whose experience we may well consider, have, with only one notable exception, adopted the other theory and made their transportation lines a government service, and I am more and more impressed with the belief that upon the wisdom of our legislation, the prudence and intelligence of its administration, depends in great measure, if not altogether, whether that experiment is to be permanently successful or whether the other and most undesirable result will be reached at no remote date.

"I realize in some degree the difficult and delicate questions which have arisen and must arise between state and federal authorities, and I can see in that direction the possibility of such disappointing and unsatisfactory results as, instead of promoting popular confidence in railway regulation, will furnish an impetus toward a movement in favor of the nationalization of our railway systems. That to me is a constant admonition that we should seek that substantial harmony of legislative measures and that substantial cooperation in our administrative policies as will result not only in the wise and useful regulation of our railway systems, but strengthen and confirm that policy as against government ownership.

"I trust the deliberations of this convention will be of peculiar satisfaction to all its members, as I am sure they will be of permanent value to our common country."

(2) BEFORE THE RAILWAY BUSINESS ASSOCIATION AT NEW YORK, NOVEMBER 22, 1910.

"The question of railroad rates, that is to say, of railroad revenues, involves vastly more than the direct interest of shippers or shareholders. In a very real sense, in a sense which is fortunately coming to be better understood, it is a great question of national policy second to none in its economic importance. Speaking only for myself, and without reference to the pending controversy over rate advances or any other concrete instance, I suggest three aspects of this question which are of immediate and intense public concern. If our country is to grow and prosper as it ought, if its untold resources are to be developed and its swelling numbers find profitable employment, we need and must have railway earnings sufficient for three things:

"First. A return on railway investments of such amount and so well assured as to attract and secure the necessary capital—an enormous sum in the aggregate—to improve existing roads and to construct without delay thousands of miles of new lines in fruitful districts now destitute of any means of transportation. It is a matter of common knowledge that the output of traffic for the fiscal year 1907 exceeded our entire carrying capacity on land and water. With the rapid increase of population and of productive efficiency, that is, with a greater army of workers and better industrial organization, the volume of that year ought to be and will be nearly doubled in another decade if only we can provide for its prompt and proper distribution. And when we think of the rich regions yet unopened because unserved, when we recall, for example, that there is today in the old state of Maine a section larger than the whole of Massachusetts in which there is not a rod of railroad, must we not be impressed with a realization of pressing need and of boundless opportunity! Since it is our national policy —and long will be, I trust—to rely upon private capital and private enterprise to provide these great highways of commerce, to improve and multiply them in pace with our requirements, must we not in the larger public interest, whatever may be thought by this or that shipper, make the business of furnishing railroad transportation, which shall be up to the best standard of efficiency, convenience and safety, so desirable to the investor that the necessary funds for betterments and extensions will be forthcoming, and so attractive as a vocation that the highest ability will be employed in its management? Otherwise, if unhappily this is not done, must not our country come measurably to a standstill and face a future of comparative stagnation?

"Second. The payment of liberal wages to an adequate number of competent men. This not only to insure increasing skill and reliability in a service which is all the while becoming more exacting, and on which the safety and comfort of the public constantly depend, but also because of the very great influence of railway wages upon the compensation of labor in every sphere and grade of private employment. To my mind the fundamental social problem is to provide, by the wise development of our institutions and without radical action or injustice, for a more equable diffusion of the bountiful wealth which the earth produces. Now, as a large and increasing majority of the able-bodied live, and must live, by working for others in some capacity, a high and advancing standard of payment for service of every sort tends strongly to promote, and is the best practical means to bring about that degree of equality in social welfare which makes for the satisfaction and happiness of all our people.

"Third. The betterment of existing lines so as to greatly augment their serviceableness to the public, as can in varying degree be done everywhere, without unnecessary and undesirable increase in capitalization. Every dollar borrowed to improve a road now in operation involves a permanent addition to the interest charge which the public is required to pay; the improvement from current earnings puts no lien upon the property, but rather augments its value and usefulness, and by adding to the security of the capital already invested tends to a lower rate of interest upon that capital. Broadly speaking, this means a national policy, so to speak, in respect of railroad rates and revenues in harmony with our national policy in other matters of public concern, and in accordance with that enlarging spirit of altruism which manifests itself in public as well as in private life, and which impels the present assumption of burdens that might be escaped or deferred in order that another generation may have an easier task and a larger opportunity. Is it not in this particular field a wise and patriotic policy?"

FARMER'S SHARE OF THE CONSUMER'S COST

By Hon. James Wilson,
Secretary of Agriculture.

FROM THE REPORT OF THE DEPARTMENT OF AGRICULTURE FOR THE YEAR 1910.

High prices was one of the subjects of my annual report for 1909. It was shown that for many years previous to about 1897, or a little later, the prices of farm products received by farmers were even less than the cost of production, and often little if any above that cost, so that during a long period of years the farmer was not thriving. It was shown also that in the upward price movement, which began about 1897, the prices received by the farmer have advanced in greater degree than those received by nearly all other classes of producers. That this should have been so was merely a matter of justice to the farmer to equalize the reward of his efforts with the rewards received in other lines of production.

Increase of Beef Prices.

The price received by the farmer is one thing; the price paid by the consumer is far different. The distribution of farm products from the farm to consumers is elaborately organized, considerably involved and complicated, and burdened with costly features. These are exemplified in my report for 1909 by a statement of the results of a special investigation into the increased cost of fresh beef between the slaughterer and the consumer.

It was established that in the North Atlantic States the consumer's price of beef was 31.4 per cent higher than the wholesale price received by the great slaughtering houses; 38 per cent higher in the South Atlantic States; and 39.4 per cent higher in the Western States. The average for the United States was 38 per cent.

It was found that the percentage of increase was usually lower in the larger cities than in the smaller ones and higher in the case of beef that is cheap at wholesale than of high-priced beef. It was a safe inference that the poorer people paid nearly twice the gross profit that the more well-to-do people paid.

THE DAIRYMAN GETS ONE-HALF THE MILK PRICE.

Another investigation into the increase of prices in the process of distribution was made in the last week of June, 1910. This time the object was to discover what fraction of the consumer's price was received by the farmer. It was a time of high prices, of high cost of living, and the aim was to ascertain to what extent the farmer received a return out of the high consumer's cost of farm products.

The investigation covered 78 cities scattered throughout the United States, and the information was contributed by a large number of the Department's crop correspondents and by some of its special agents, who made inquiries in all of the 78 cities. The cities were divided into geographical groups for the purpose of computing averages, and these were combined into an average for the United States, all after proper weighting according to importance.

Milk was one of the commodities under investigation—a food product indispensable to a large fraction of the families of the Nation, and now a costly one to all consumers.

While it is true that the dairyman is receiving considerably more for his milk than he did before the present era of high prices, yet it was discovered in this investigation that throughout the United States he receives a scant 50 per cent, or one-half of the price paid by the consumer. The other half goes to the railway company for carriage, to the wholesale milk dealer, if there is one in the chain of distribution, and to the retailer who delivers at the consumer's door.

Freight charges for carrying milk vary according to distance, but their average may be regarded as approximately about 7 per cent of the consumer's price. With the farmer receiving about 50 per cent of that price and the railroads 7 per cent, the remaining 43 per cent of the consumer's price is received mostly by the retailer.*

The milk wagon of the retailer has a long route. It stops at a house or two in one city block, perhaps passes several blocks without stopping, and so proceeds to serve customers thinly distributed along a route of miles. At the same time the milk wagons of other retailers are covering various portions of the same route, and so there is a great waste of effort and of expense in the distribution.

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*Note—Milk is carried by rail on passenger trains, or by special milk express service.

The division of states in which the cost of distributing milk from producer to consumer is the most is the North Central group, in which producers receive 44 per cent of the prices paid by the consumer. Next in order follow the Western States with 47 per cent, the North Atlantic States with 53 per cent, the South Central States with 55 per cent, and the South Atlantic States wih 57 per cent.

The average price paid by consumers in the 78 cities is almost exactly 8 cents per quart. In the North Atlantic and North Central States the average is 7.5 cents; in the Western States, 8.9 cents; in the South Central, 9.1 cents; and in the South Atlantic States, 9.3 cents. These prices are for the last week in June, 1910.

BUTTER AND THE RETAILER.

Factory butter was included in this investigation of prices, in the three classes of creamery print, creamery tub, and renovated. Consumer's prices were taken in 78 cities in all parts of the country and the facts were ascertained in the latter part of June, 1910.

In the distribution of creamery butter from factory to consumer the ultimate price includes the railway charge for transportation and the retailer's addition. *The freight charge is about 0.6 of 1 per cent of the consumer's price.*

As a general average for the 78 cities, the creamery receives 86.3 per cent of the consumer's price for creamery prints. The percentages are nearly the same in all geographic divisions, the lowest, 84.6 per cent, being found in the Western States, and the highest, 87.5 per cent, in the South Atlantic States.

In the case of creamery tub butter, the factories receive 86.5 per cent of the consumer's price in the 78 cities, the Western States again having the lowest percentage, 84.6 per cent. The highest percentage is 88 for the South Central States, and in the other divisions the percentage is between 86 and 87.

Factories that renovate butter receive a somewhat larger percentage of the consumer's price than in the case of creamery prints and tub butter. The average for the 78 cities is 88.3 per cent, with inconsiderable variations among the geographic divisions of the country.

The increase of price of farm products in their transfer from producer to consumer was thoroughly investigated in all parts of the country and for a large variety of products by the Industrial Commission. Although the facts obtained in that investigation are now about ten years old, it is believed that the ratios between producer's and consumer's prices are approximately the same now as they were then. At any rate, it seems probable that the farmer is not now receiving a larger share of the consumer's price than he received ten years ago, and he may be receiving a smaller share.

POULTRY.

Within the field of investigation it was found that poultry almost doubled in price between the farmer and the consumer; in other words, the farmer received only 55.1 per cent of the consumer's price. Inquiries were made concerning turkeys as distinct from other poultry, with the result that it was found that the farmers received 63.5 per cent of the final price. Chickens as a separate description are represented by the percentage of 68.4 when priced by the pound, and by 57.1 per cent when priced by the head.

Of the price per dozen paid by the consumer, the producer received 69 per cent in the case of eggs; dried beans, 75 per cent when bought by the bushel; cabbage, 48.1 per cent when bought by the head and 64.9 per cent when bought by the pound; cauliflower, 75 per cent when bought by the dozen; and celery, 60 per cent when bought by the bunch.

THE SMALLER THE RETAIL UNIT, THE LESS THE FARMER RECEIVES.

The general fact was that the producer's percentage of the consumer's price diminished as the quantity sold at retail was smaller. For instance, the apple grower received 55.6 per cent of the consumer's price when the consumer bought by the bushel and 66 per cent when the purchase was by the barrel. When the consumer bought corn by the bushel, the farmer got 70.6 per cent of the price, but when the purchase was by the barrel the farmer received 81 per cent. The strawberry grower received 48.9 per cent of the consumer's price in purchases by the quart and 75.9 per cent in purchases by the crate. A still better illustration is found in the case of onions. In purchasing a peck at a time, the farmer received 27.8 per cent of the retail price; in purchases of a barrel, he received 58.3 per cent; and in purchases by the 100 pounds, he received 69 per cent. So in the case of oranges, when the purchase was by the dozen the grower received 20.3 per cent of the consumer's price, whereas when the purchase was by the box the grower received 59.3 per cent.

FACTS FOR MANY PRODUCTS.

Farmers received 83.3 per cent of the final price in the retail purchase of blackberries by the crate, 75 per cent in the purchase of cucumbers by the third of a bushel, 66.7 per cent in the purchase of egg-plant by the crate, 60 per cent in the purchase of green peas by the quart, 70.5 per cent when hay was bought by the ton, and 82.2 per cent in the purchase of horses from retailers.

Among the many other products represented in this list are oats, with 73.6 per cent of the price going to the farmer when bought by the bushel; melons, 50 per cent when bought by the pound; parsnips, 60 per cent when bought by the bunch; potatoes, 59.3 per cent when bought by the bushel; string beans, 80 per cent when bought by the barrel; sweet potatoes, 60.8 per cent when bought by the barrel; turnips, 60 per cent in purchases by the bunch; watermelons, 33.5 per cent when bought singly.

In some cases there were purchasers from the farmer who were middlemen. It was found that cotton growers received 93 per cent of the price paid by cotton manufacturers for the raw cotton; 84.1 per cent of the price of broom corn paid by the broom manufacturers; 80 per cent of the price of calves and 91 per cent of the price of cattle paid by packers; 93 per cent of the price of hogs and 74.2 per cent of the price of lambs obtained by packers; 87 per cent of the price of tobacco paid by the hogshead and 92.2 per cent when bought by the pound by manufacturers; 72.9 per cent in the case of wheat bought by millers; and 91.7 per cent in the case of wool bought by manufacturers.

FREIGHT CHARGES.

To the foregoing percentages that represent the share of the farmer in the consumer's price should be added the percentage standing for the freight charge in determining the share of the consumer's price that goes to the middlemen.

With approximate accuracy it has been determined that when the farmer received 50 per cent of the consumer's price, the freight charge on butter is about 0.5 of 1 per cent of the consumer's price; eggs, 0.6 of 1 per cent; apples, 6.8 per cent; beans, 2.4 per cent;

potatoes, 7.4 per cent; grain of all sorts, 3.8 per cent; hay, 7.9 per cent; cattle and hogs, 1.2 per cent; live poultry, 2.2 per cent; wool, 0.3 of 1 per cent.

The foregoing allowances for freight are to be increased by one-half when the farmer receives about three-fourths of the consumer's price.

COFFEE AND TEA PRICES.

The import statistics of the Department of Commerce and Labor afford some striking comparisons between original value and consumer's price. In the fiscal year 1910 four-fifths of the coffee imported into the United States came from Brazil; 17 per cent from other countries in South and Central America and from Mexico, so that 97.2 per cent of the imports were from Mexico, Central and South America. About 0.1 of 1 per cent of the coffee imports are from Aden and are the nominal Mocha coffee, and 1.3 per cent of the imports are from the East Indies and are the Java coffee.

In 1910 the coffee imported from American countries, which was 97.2 per cent of all coffee imports, had an import value of 7.8 cents per pound. *To this should be added the ocean freight rate. From Rio Janeiro the rate is 0.28 of 1 cent, or about one-fourth of a cent per pound.* For nearly all of this American coffee the consumers paid prices ranging from 20 to 35 cents per pound. In other words, the import value, plus the ocean freight charge, is only from 23 to 40 per cent of the principal range of prices paid for the coffee at retail.

Tea may be referred to in the same way. In the fiscal year 1910 the average import value of tea was 16 cents per pound. It is assumed that nearly all of the tea consumed in this country is bought at retail prices ranging from 50 to 70 cents per pound and, with this understanding, the import value of tea is from 23 per cent to 32 per cent of what the consumer pays.

CONSUMER'S PRICE AS AN INCREASE OF FARMER'S PRICE.

In the consideration of this subject so far, the aspect has been that of the producer; the farmer thinks of the price that the consumer pays for farm products and compares with them the price that he himself receives.

While the farmer is looking forward with regard to the prices of his products, the consumer is looking backward, and so regards the prices that he pays as increases upon what the farmer gets. This aspect of the matter may now be worth some attention.

It is established by the investigation of this Department made last June that the milk consumers of 78 cities paid for milk an increase of 100.8 per cent above the price received by dairymen; in other words, the farmer's price was fully doubled. The lowest increase among the geographic divisions was 75.5 per cent in the South Atlantic States and the highest was 111.9 per cent in the Western States.

In the purchase of butter the consumer pays 15.8 per cent above the factory price in the case of creamery prints, 15.6 per cent above in the case of factory tub, and 13.3 per cent above the factory price in the case of renovated butter. The percentages of increase among the five divisions of States do not vary much from the averages for the United States.

Some large percentages of increase of prices were found by the Industrial Commission—135.3 per cent for cabbage bought by the head; 100 per cent for melons bought by the pound, for buttermilk sold by the quart, and for oranges sold by the crate; 260 per cent for onions bought by the peck; 400.4 per cent for oranges bought by the dozen; 111.1 per cent for strawberries bought by the quart; and 200 per cent for watermelons sold singly.

There were many cases of increase of consumer's price over farmer's price amounting to 75 per cent and over, but under 100 per cent, and among these were 90.5 per cent for apples bought by the barrel and 80.6 per cent for apples bought by the box; 75 per cent for chickens bought by the head; 83.4 per cent for onions bought by the pound; 80.5 per cent for potatoes bought by the bushel; 88.8 per cent for poultry in general bought by the pound; 95.8 per cent for strawberries bought by the box; 82.5 per cent for sweet potatoes bought by the bushel.

It may be worth while to extend the list of farm products that are sold to consumers at a large increase above farm prices. In the class of commodities selling for an increase of price amounting to 50 per cent and over but under 75 per cent above farm prices may be mentioned the following increases; 61.8 per cent for cabbage bought by the pound; 66.7 per cent for celery bought by the bunch, turnips and parsnips bought by the bunch, and green peas bought by the quart; 54.4 per cent for chickens bought by the pound; 50 per cent for eggplants bought by the crate; 68.4 per cent for onions bought by the bushel; 68.7 per cent for oranges bought by the box; 60 per cent for potatoes bought by the peck; 59.8 per cent for turkeys bought by the pound.

The import price of coffee in the fiscal year 1910, which was 8 cents a pound, after the increase to 20 and 35 cents per pound to the retailer, has risen in price to the consumer from 150 to 337.5 per cent. So with tea of the same fiscal year; its import price of 16 cents per pound, after being increased to 50 to 70 cents per pound, cost the consumer an advance of 212.5 to 337.5 per cent.

Before assigning to middlemen the various increases of prices, it is proper to deduct the percentages due to freight rates. The freight charge for milk received in New York is about 18 per cent of the producer's price and in Chicago about 14.7 per cent. Of the import price of coffee, the ocean freight charge from Rio Janeiro is 3.6 per cent. The percentages of farm price for which freight charges stand in the United States may be estimated at approximately 0.9 of 1 per cent of the factory price for butter; 1.2 per cent of the farm price for clover seed; 1.6 per cent for cotton; 1.3 per cent for eggs; 13.6 per cent for apples; 4.8 per cent for beans; 14.8 per cent for potatoes; and 5 per cent for sweet potatoes. The rates for oats, rye, barley, and wheat are nearly the same, ranging from 6 per cent for oats to 7.3 per cent for barley and rye. The rate for corn is 9.2 per cent and the average for all grain is 7.7 per cent. For hay the percentage is 15.8 per cent; for cattle and hogs, 2.5 per cent; for live poultry, 4.5 per cent; and for wool, 0.6 of 1 per cent.*

NO GROUND FOR COMPLAINT AGAINST THE FARMER.

From the details that have been presented with regard to the increase of the prices of farm products between farmer and consumer, the conclusion is inevitable that the consumer has no well-grounded complaint against the farmer for the prices that he pays. The farmer supplies the capital for production and takes the risk of his losses; his crops are at the mercy of drought, and flood, and heat, and frost, to say nothing of noxious insects and blighting diseases. He supplies hard, exacting, unremitting labor. A degree and range of information and intelligence are demanded by agriculture which are hardly equaled in any other occupation. Then there is the risk of over-production and disastrously low prices. From beginning to end the farmer must steer dextrously to escape perils to his profits and indeed to his capital on every hand. At last the products are started on their way to the consumer. *The railroad, generally speaking, adds a percentage of increase to the farmer's prices that is not large.* After delivery by the railroad the products are stored a short time, are measured into the various retail quantities, more or less small, and the dealers are rid of them as soon as possible. The dealers have risks that are practically small, except credit sales and such risks as grow out of their trying to do an amount of business which is small as compared with their number.

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*As the prices received by the farmer and paid by the consumer go up the percentage for freight recedes.

PROBLEM FOR CONSUMERS AND NOT FARMERS TO REMEDY.

After consideration of the elements of the matter, it is plain that the farmer is not getting an exorbitant price for his products, *and that the cost of distribution from the time of delivery at destination by the railroad to delivery to the consumer is the feature of the problem of high prices which must present itself to the consumer for treatment.*

Why do not consumers buy directly from the farmers? A distribution of farm products in this simple way has already begun in England, where co-operative organizations of farmers are selling by direct consignment to co-operative organizations of consumers in cities.

Farmers' co-operative selling associations are numerous in this country, but co-operative buying associations among the people of cities and towns are few. Aside from buying associations maintained by farmers, hardly any exist in this country. It is apparent, therefore, that the consumer has much to do to work out his own salvation with regard to the prices that he pays. Potatoes were selling last spring in some places where there had been over-production for 20 cents and in some places for even 9 cents per bushel at the farm, while at the same time city consumers in the East were paying 50 to 75 cents per bushel, although there was nothing to prevent them from combining to buy a carload or more of potatoes directly from the grower and for delivery directly to themselves.

MR. ACWORTH ON AMERICAN RAILWAYS

Mr. W. M. Acworth, who is the ranking international authority on railway economics, and who from time to time inspects American railways in the interests of English investors, recently returned to England after a two months' inspection of the railways of the United States.

Just before sailing for England, Mr. Acworth in commenting on the present status of railways in the United States, said in part:

"I have been somewhat surprised to see the space that has been given in your newspapers to the criticisms of the efficiency of your railways. It has been my opinion that in actual economy of operation the railways of the United States are first in the world. In the number of tons per car, cars per train; in the fullest utilization of locomotives; in the obtaining of the greatest measure of result for each unit of expenditure, they are not equalled by the railways of any other nation. When the Greek commanders after the battle of Salamis voted who should receive the prize for valor each put his own name first, but all put the name of Themistocles second. And Themistocles received the prize. So too, though German, French and English railway men would, I dare say, all put their own railways first in efficiency they would all, I am sure, put yours second, and on the voting of the experts your railways would come out first.

"But further, your nation as a whole is not in other matters pre-eminently efficient. No one would say that your farmers were more efficient than those of France and England or that your government is more efficient than the government of Prussia. Your railways have reached a higher standard in international comparison than your farmers or your government, and under greater difficulties, for in England and on the Continent employment with a railway company is a prize and a man hopes to remain in the service of the same company throughout his life. He is, therefore, obviously more amenable to discipline than the shifting and often even foreign force employed on your railways.

"The investors of Europe and even your own Wall Street seem hardly to grasp the enormous amount of money that must be spent upon railroads to keep pace with your growing traffic. If your traffic doubles every ten years, as it substantially does, you will need not perhaps to double your facilities every ten years, but to increase them at least by 50 per cent. The eleven hundred millions per year specified by Mr. Hill as necessary for this purpose is none too much. The inhabitants of your Western and Southern States, your people in general, must understand that this capital cannot be obtained in their own communities.

"Texas and Oklahoma have no money to spare for railroad building. They want it all for their own local business. Even the East cannot find all the money required. This money in large measure must for a long time to come be raised abroad; and the investors of other lines will not be willing to subscribe it so long as there is a continuance of the harrassing conditions which tend to impair the revenues of your railways, to hamper their administration and to retard their development. If the railways of the United States could reach a time when State legislators ceased from troubling and State commissions were at rest it would in my thinking be good for the railways and still better for the citizens of the United States."

SAME CAUSE OF HIGH PRICES IN SWITZERLAND.

From Consul D. I. Murphy, St. Gall, Switzerland, April 28, 1911.

In the early nineties, complaints of the high prices of vegetables in St. Gall were so numerous that the police authorities made an investigation to determine the cause, but it was not until 1908 that the cantonal legislature took up the matter. It was found that between producer and consumer there were so many middle men to share profits that prices were greatly advanced—in the case of cabbage, by no less than 369 per cent. Then the Consumverein, a corporation that appears to have regard for the public welfare, undertook to buy vegetables direct from the producers and sell them in their many provision stores throughout this region at a minimum profit. A general reduction of over 30 per cent quickly followed. As nearly as can be ascertained by comparison with quoted prices in American newspapers, the present prices of vegetables here are a trifle less than in the markets of New York or Philadelphia.

THE FARMER AND THE COST OF LIVING

By B. F. Yoakum,

Chairman of the Executive Committee of the 'Frisco and Allied Lines.

IN THE SATURDAY EVENING POST, AUGUST 6, 1910.

Farmers, and not military power, must restore our economic balance. The politicians pour out the Government's money to build fighting machines and starve the agriculturists. The appropriations of this last Congress amount to more than one billion dollars. Thirty dollars of this went for military expenses to every dollar spent for agriculture.

It is necessary that we aid the farmer in the adoption of better agricultural methods in order to increase production, and that he be helped to a better business system, so as to increase his profits and at the same time assist in reducing the cost of living to the consumers. The promises of politicians in their agitation for radical legislation will not assist in working out this important American problem.

A recent writer in *The Saturday Evening Post* said that the annual waste in handling the two-hundred-million-dollar Texas cotton crop would make the Standard Oil's mouth water. The cotton planters of Texas do not need more laws, but the application of ordinary business methods in handling their cotton.

The farmers of southern Texas discovered a few years ago that their soil was well adapted for growing Bermuda onions. The onion industry was soon found to be unprofitable on account of poor marketing facilities. They employed a good man and put the selling in his hands, with the result that a losing business was made a profitable one. All the laws which Texas might make could not help these onion farmers. It required the employment of business methods. What applies to the onion crop of Texas applies to every other product of the soil in the United States.

The farmers of the country will eventually work under a strictly business organization for their own protection and to the advantage of the consumers of food. At the growing end the farmers will have, through co-operation with the railroads, shipping agencies. At the consuming end they will have marketing agencies. Under this method the men who produce, the men who transport and who consume will come into close contact. To the industry of farming will be added the business of marketing.

It is not the amount of potatoes, cabbages, onions, grain, dairy products or other foodstuffs a community of farmers produces that fattens their bank accounts. It is the price for which they can sell them and the waste they can cut out between the farm and the table. It is not the prices that the farmers are getting that make living so expensive. It is the expense of getting them to the railroads and the profits of dealers, wholesalers and retailers.

After a careful investigation, it is estimated that during the past year the farmers received and the consumers of the city of New York paid, for the following articles of food, approximately the amounts respectively shown:

Eggs	$ 17,238,000	$ 28,730,000
Coffee	2,402,000	12,009,000
Rice	1,354,000	6,191,000
Cabbages	1,825,000	9,125,000
Onions	821,000	8,212,000
Milk	22,912,000	48,880,000
Potatoes	8,437,000	60,000,000
Meat and poultry	219,300,000	291,000,000
Total	$274,289,000	$464,147,000

The freight paid on the above articles was approximately $25,045,000.

On only these articles of food, for which the farmers received $274,289,000, the expenses and profits of the middlemen were $164,813,000 after paying the freight bill of $25,045,000. In other words, in addition to the freight, the expenses of handling and profits were over sixty per cent. Reducing these expenses and profits one-half would make a saving on these articles of $82,406,500 annually. These articles represent approximately five-eighths of the annual food bill of New York. If the same proportions obtained as to the balance of New York's food bill, the expenses and profits paid by consumers would be $265,800,000 annually, or about $728,000 a day.

This is the big business proposition that confronts New York and applies to all consuming centers, and the only way to work it out is to tackle it in detail, cutting out every possible waste, expense and needless profit.

To handle this immense quantity of food will require extensive facilities. The railroads entering New York have hundreds of millions of dollars invested in terminals to handle and distribute the business of this one consuming point. Six hundred and forty million dollars have been expended in streets cars and subways for handling New York's four million people. But nothing is being done to lessen the cost of local expense on this great bulk of food.

There are living on Manhattan Island two and a half million people. Splendid passenger facilities are provided to transport these people, but none to handle their food economically. A tunnel could be built with tracks to be utilized for freight between certain hours, with distributing stations every ten or fifteen blocks for marketplaces, where all table food could be supplied. Conducted under proper regulations, the six hundred carloads a day of foodstuffs coming to New York could go to these marketplaces with a saving of one hundred and fifty million dollars annually, or four hundred and ten thousand dollars daily, to the people of New York, and allow twenty per cent for handling. There is no common-sense argument against convenient marketing centers in large cities. They are just as practicable as the establishment of passenger stations. While the passengers can take care of themselves, a business system is necessary to handle the consumers' daily supplies.

The railroads are doing more than their share in working for an economical handling of freight in cities. The money required for terminals is something enormous. Money invested in terminals does not add proportionately to the earning power of lines, yet it is necessary for the railroads to provide for proper deliveries of business.

The cost of getting food supplies to the railroad in the country over poor public highways, and of getting these same supplies to the homes in the city, is out of all proportion to the railroad charge for transportation. The Government is largely responsible for one of the biggest expenses, which comes from the fact that the greatest country in the world has the worst public highways.

To help cut down the producers' expense of bad country roads, the Government provides a little over one hundred thousand dollars a year, and buys battleships for eighteen million dollars apiece. It requires no investigating committee to pick out the effects of this kind of pinching and squandering of money on cost of living.

Our commerce and manufacturing industries have grown beyond expectation. Our railroad systems are by far the best in existence, handle business for the American people at less rates than any in the world, and pay their employes better wages than the railroads of any other country. They are now economically operated, but we do not know how long this will continue. It is to be expected that, as the Government takes more and more control of the transportation, the expense of operation will increase. Senator Aldrich recently said that if the Government were operated as a private business the running expenses could be reduced three hundred million dollars annually, or practically one-third the present operating expenses of the Government. It is true, and shows the wasteful political methods which the politicians have not undertaken to correct.

GUIDE POSTS FOR THE PUBLIC.

The expense of running all the railroads of the United States is now approximately two billion dollars a year. On the same ratio of extravagance as the Government, the gross earnings of the railroads, approximately three billion dollars, would soon be absorbed under Government policies if the politicians were to get full control, which they are gradually doing.

The agitations and threats that are emanating from Washington are doing more real damage than the actual legislation. Ceaseless agitation has a tendency to make investors lose faith in railroad securities. There is no mystery about costs and income in the railroad business. Any man can find out as much as any railroad man knows. The railroad man may know it a little sooner, but he depends upon the same figures as are on file in Washington. These available statistics will show that if railroads were now getting the same rates as received twelve years ago, their income would be two hundred and eighty-nine million dollars more than received at the present rates.

These statistics will show the Congressmen, just as they show the railroad men and the public, that, if their equipment and operating material and supplies could have been purchased by the railroads last year at the prices paid twelve years ago, they would have cost two hundred and forty million dollars less. Also these statistics will show that the labor bill last year was one hundred and ninety-seven million dollars more than for the same service twelve years ago. These, with other items, made a difference to the railroads last year of seven hundred and thirty-eight million dollars as against twelve years ago.

The railroads of the country, during the last fifteen years, have used up their surpluses and strained their credits in building new lines, acquiring new facilities and working out various economic propositions to keep up with the growth of the country's business and handle it in a manner satisfactory to the shippers and to the general public.

The safest securities that the railroads will have to offer to investors in the future will be securities issued by the existing roads to take care of their necessities on existing lines and to provide additional terminals.

Conservative investors will not care to buy securities of new railroads unless such securities have the guarantee of existing roads, as they will have to wait four or five years, with the possibility of a receivership, before any income can be had from the earnings of these newly constructed railroads.

Legislation that tends to prevent new construction can be regarded as a bull argument in favor of existing railroads and a bear argument against the country's future growth and development. For the development of the country up to its present high standard it has required for the last thirty years an average of forty-seven hundred miles of new railroad annually. There should be constructed at least as much new mileage annually in the future to enable the country to reach its full development. To build and equip forty-seven hundred miles of railroad costs not less than one hundred and eighty-eight million dollars, fully eighty per cent of which goes for labor and the products of labor. Each forty-seven hundred miles gives permanent employment to twenty-eight thousand employes of all classes. Therefore, unwise legislation does not so seriously affect the class of men that are being criticised by the politicians as it does the class of men that work by the day and are upon the payrolls of the company.

When we consider that the country west of the Mississippi River, which constitutes seventy per cent of our entire area, yet requires one hundred and forty thousand miles of railroad to give it the same railroad facilities on an area basis as the country east of the Mississippi River, we can understand what any action that retards railroad building would mean to the country at large. Ten miles is as far from a railroad station as a farmer can profitably do business. A twenty-mile round trip for a team a day is as far as he can profitably extend his business from a railroad.

Some of the Western states have post-offices more than fifty miles from a railroad, as follows:

Colorado	25	post-offices
California	10	" "
Oregon	40	" "
Washington	5	" "
Utah	15	" "
Montana	12	" "
New Mexico	6	" "
Nevada	12	" "
Idaho	25	" "
North Dakota	4	" "
South Dakota	4	" "
Wyoming	10	" "
Kansas	3	" "
Arizona	10	" "
Texas	25	" "

The territory in the United States that is fifty miles or more from any railroad, without considering Alaska, is equal to the total area of England and France.

Our Western states are rich in fertile soil, which irrigation and improved methods of farming are making productive. They are adding to our agricultural wealth as fast as railroads can be made available for their development. Additional railroad building will not take place if investors are constantly told that their investments will not yield fair profits, and that there are yet to come, during the next Congress, more restrictive laws.

Existing railroads will only construct new lines as they need them. The large railroad systems of the United States have been built through promoters of small railroads which have been taken into the systems later. Under existing conditions such development is a thing of the past, although there is not a Western state that is not today plastered with new short-line railroad charters largely necessary for the development of the outlying country. But the money is not to be had for them to carry out their enterprises.

The prevailing opinion is that our farmers are growing rich. Our farmers are receiving advanced prices for their products, but they are paying equally advanced prices for everything they buy for family use and machinery for their farmwork. Their margin of profit is largely absorbed by the increased price of things they must buy. They have not been benefited by freight reductions made to dealers.

There are six million two hundred thousand farms in the United States. There is an average of four and a half persons to the farm. The value of the products of the farms last year was eight billion seven hundred and sixty million dollars, or an average of about three hundred and fourteen dollars for each member of a farming family. This means that three hundred and fourteen dollars last year had to clothe, feed, educate and provide everything for one person on the average farm, besides paying his proportion for help, taxes, repairs to buildings, machinery and tools, the care of the animals and the upkeep of the farm. This shows that the farmer's return is comparatively small. He works long hours with no overtime. He hitches up early and feeds late.

The public men who are responsible for our national laws have not given proper consideration to the development of our agricultural interests. They are satisfied to make political capital by telling the farmers they must be protected against corporate greed. This is all right for the politician, but it does not aid the farmer; it does not help the consumer. Such talk does not add one acre of new ground, nor increase production, nor provide better marketing facilities for the men whose business is farming.

THE OLD WORLD BLAZES A TRAIL.

The continued production of the farms of the older countries has been accomplished by proper nourishment. The Department of Agriculture report tells us that Germany alone uses annually over half a million tons of nitrate of soda; two hundred and seventy-five thousand of sulphate of ammonia; one million two hundred thousand of superphosphate; one million four hundred thousand of basic slag and a large quantity of potash salts. Moreover, they rotate crops and use leguminous plants liberally.

The thrifty farmers of the old countries have, on every hundred cultivated acres, seventy-eight per cent more cattle than we have; forty-five per cent more horses; seventy-five per cent more hogs and thirty per cent more sheep and goats. The result on these well-stocked farms is profitable and adds to their fertility.

The employment of ordinary business methods and up-to-date agricultural ideas in farming is necessary with us if we are not to have abandoned farms in the middle West just as we now have in New England. From 1890 to 1900 there was a decrease of thirty-eight per cent in the improved farm land of New England. In all the New England states there was an average loss of nearly ten per cent in rural population and a gain of more than forty per cent in city population. But what is a more serious condition is that Ohio showed a five-per cent loss in farm population and a gain of thirty per cent in city population.

Unless something is done, this change, now reaching to the Mississippi Valley, will extend over the great prairies to the foothills of the Rockies.

In short, the American farmer is up against an important business proposition—one in which a good share of the surplus money of the country can be well employed. The national industry is entitled to the attention of the financial interests, as well as the encouragement of the Government, if we are to have our own people supplied with foodstuffs at fair prices and at the same time continue the balance of trade in our favor against foreign nations. Both must be done through business methods, and not through Congress taking up two-thirds of its time, as was the case in the last Congress, in the debate and passage of a railroad bill of no material advantage to the country, and only one day in the discussion of the high cost of living.

RAILWAY MAIL PAY PRIMER

Issued by Committee on Railway Mail Pay.

REPRESENTING 139 RAILROADS WITH 192,808 MILES OF ROAD.

What is the measure of service rendered by the railroads in handling United States mail?

492,960,059 ton miles new basis (old basis 532,096,419 ton miles), year ending June 30, 1909.

The mail alone?

Yes. The mail and bags.

How much did United States pay the railroads?

$49,737,519, out of which they have to meet many expenses imposed on them by regulation and law.

Does United States furnish any facilities?

Only the clerks on the cars.

What do they do?

Postoffice work.

What's that?

Same as in postoffices. Postal cars are postoffices on wheels.

Does United States pay clerks' fares?

No.

How much does their travel foot up?

In 1908, the equal of one man riding 629,778,443 miles.

At 2 cents per mile that would be how much?

$12,595,568.66.

These men must weigh something?

At 160 pounds average, their haul would be equal to 50,382,275 tons one mile.

Does United States require the railroads to furnish anything else free of charge?

Yes. Office facilities at railroad junctions and terminals; delivery of mail to postoffices which are within a quarter of a mile of station; and free annual passes for about 600 postal officials on all railways carrying mail.

What revenue does the United States receive per pound for mail?

An average of about 12.88 cents per pound tendered by the public.

What does United States pay the railways?

About 3 cents per pound for every pound of matter tendered the railroad.

That is, out of every dollar received the Government pays the railroads 20 cents?

Yes.

Does the rural free delivery cost much as yet?

United States spent 72 cents for rural free delivery in the limited territory thus served, for every $1 paid the railroads for their entire hauling in the year 1909.

How is the service rendered by the railroads ascertained?

By actually weighing the mail matter carried.

Weighing every parcel carried for a year?

Oh, no! Weighing for 105 consecutive days only once every four years and finding the average for one day over the whole length of route.

Is this the weight United States pays for during the entire four years following a weighing?

Yes.

Why only every four years?

A law requires weighing not less often than once in four years.

Then weighing oftener is not prohibited?

No.

Would the railways prefer weighing, say, once a year?

Yes.

Why?

Mail increases regularly with growth of country. Each four years means a large increase in weight, and as the pay is based on the smallest weight carried at the beginning of the period, the increases each year are carried with no pay whatever.

Why are yearly weighings not made?

The postoffice officials interpret the law to mean they don't have to, and they don't do it, as it is not to their interest.

Is that fair to the railways?

It is not, as they are deprived of amounts to about 10 per cent of the total revenue received for mail transportation. During last ten years the weight increased 80 per cent, an average of 32 per cent each four years.

Has the pay increased 80 per cent?

No. Only about 40 per cent.

Why?

Because of acts of Congress and orders of postmaster general arbitrarily cutting rates of pay; automatic reductions of rates prescribed by law with increased tonnage.

Can you name some?

Yes. March 2, 1907, United States reduced the pound rate 3½ per cent and the rental rates of post cars 16 per cent. Total $2,676,468 per year.

Was this because it cost the railways less to do the work?

No. It cost the railways more.

What other acts?

June 26, 1907, it decreed empty mail bags shall be returned, and certain supplies forwarded by freight or express. Formerly they were handled with and as part of the mail. The estimated loss to the railroads by this change is $1,000,000 a year.

Does this withdrawal return space in cars of value to the railroads, that they can sell to other patrons?

No.

What "orders" can you name?

June 7, 1907, changing methods of computing weights.

What does that mean in money?

About $4,500,000 per year loss to the railways.

Any other recent one?

Yes. Requires railways to furnish postoffice cars to run one way, and refuses to pay for hauling them back, though the cars are of no use whatever to the railways, being fitted up as postoffices and unfit for baggage or express.

Where is such a service in effect?

Omaha to Ogden line requires six postal cars to do the business. Each car weighs over 100,000 pounds and costs about $9,000. The railway buys the cars, supplies light, heat and maintenance.

How much does the United States pay the railway for the use of these traveling postoffices in such cases as just referred to?

The equivalent of one passenger fare per round trip.

Can you explain it in figures?

Yes. The United States pays 5.5 cents per mile for the going trip, with two to six passengers in it—nothing for return trip, which is the equal of 2.75 cents for the whole distance the car travels.

Why do you call the clerks passengers, and think the Government should pay for their carriage?

Because the Government demands of the railroads the same care and responsibilities as accorded passengers. The men are furnished heat and ice water and in case of accident the railroads are liable to the same extent as to passengers.

Is it possible you mean that the railroads get 5.5 cents for hauling a full car and in addition are obliged to furnish the postoffice department with free tickets for say four men worth 2.5 cents a mile each at tariff rate?

That is just what I mean. The railroads haul the car free, and pay 4.5 cents a mile for the privilege in such a case.

Why on earth do the railroads do this?

Perhaps they have never stopped to think how very foolish such a practice is. Maybe this will start them thinking.

How much do railways receive per mile for hauling empty cars?

Diners, parlor and sleeping cars on their own wheels 12 to 20 cents per mile. Passenger coaches 10 to 18 cents; baggage and express cars 8 to 15 cents; freight cars 6 to 10 cents per mile.

Then the railways receive on the average, for hauling various classes of cars on freight trains, from three to eight times as much as United States pays on these one-way runs for postoffice cars on passenger trains?

Correct.

Are postoffice cars any real value or service to railways?

They are not, as their design is fixed by the department, and being postoffices, are unfit to carry ordinary freight or baggage.

How much mail does each of these cars carry?

About what would take up one-eighth of an ordinary baggage car, or two tons.

How much more can one of these cars carry?

About 15 tons, if stripped of postoffice fittings.

What do express companies pay railways for their privileges?

50 to 55 per cent of their gross receipts.

Do express companies assume all responsibility to its patrons?

Yes.

Do express companies get any extra facilities, such as enjoyed by the postoffice, free?

No. On the contrary they contribute toward salaries of station men and train baggage men; release the railways from claims for personal injuries to employes, handle free to the railways, remittances and railway express packages. The number of express employes carried on trains is much less than on postoffice cars.

Do express companies make money on the 45 to 50 per cent which is all they get out of their receipts?

They do.

It is stated above that United States pays only 20 per cent of gross receipts for railway transportation of mails, and yet the department is operated at a loss?

That's what the report of postmaster general shows.

What is the difference in the method of charging by the express companies and the postoffice department?

The former charges according to distance; the latter as you know carries letters or other mail matter under postage without regard to distance.

How does the dead weight of cars carrying United States mail compare with the weight of the mail hauled?

21.7 tons dead weight, to one ton of mail.

How is it with passengers?

About the same.

And freight?

1.1 tons of dead weight to one ton of freight hauled.

Does United States pay rent for postoffice facilities, in cars used partly for baggage or express?

No. United States pays only when United States has the entire car, and as it then pays less than the fare of the clerks in it, and if empty only one-third to one-eighth of what the railroads secure from the public for haul alone, it is hard to find the rent.

Who decides when cars shall be exclusively postoffice?

United States.

Who specifies the construction of postoffice cars?

United States.

Who pays for them?

The railways.

Do cars now specified by United States cost more than a few years ago?

Standard steel, weighing 108,000 pounds, cost about 60 per cent more.

Are postoffice facilities in apartment cars, and full cars, provided for the convenience of the railways?

No, indeed. Entirely for postoffice.

Over how many miles were these full and apartment cars hauled in 1908?

232 millions of miles.

What is average weight of mail per car?

2.09 tons.

How much mail can storage cars without postoffice features carry?

10 to 15 tons.

If all mail were carried in storage cars how much would it reduce the car miles?

About 163 millions a year.

And this 163 millions is due to the postoffice features?

Yes.

What's the average number of cars in passenger trains in the United States?

3.95.

What proportion of that is mail cars?

About 11 per cent.

What's the average earnings of passenger trains?

$1.26 per train mile.

Does that include all mail and express earnings?

It does.

Does mail pay 11 per cent of average earnings?

No. It contributes only 9.4 cents per train mile or 7.5 per cent. To pay 11 per cent of average earnings, mail would have to pay 47 per cent more than it does.

What's the average cost of running passenger trains?

$1.47 per mile.

If United States mail paid its fair share of this cost (or 11 per cent), what would it be?

16.17 cents per train mile.

Then it is costing the railroads 16.17 cents to furnish space for which they receive 9.4 cents, or 72 per cent more than they get for it?

More nearly 100 per cent when to operating expenses are added taxes, interest on bonds, etc.

As population grows denser, does amount of mail increase?

Certainly.

Then in time the increase in weight brings proportionately increased pay?

It does to the United States. It's same postage rate for letters if there are 2 or 2,000,000.

The railways of course receive pay in proportion to the increase weight?

They do not.

Why?

The rate is decreased as the weight increases.

Give example.

200 pounds or less average over length of route is on non-land-grant roads, $42.74 per mile per year. On land-grant roads it is $34.20. When it is an average of 5,000 pounds, or 25 times as great, the rates are $171 and $136.80, only four times as great. Intermediate weights are proportional.

Is this reduction a voluntary one on the part of the railways?

It is not.

Who makes it?

Congress and postoffice department.

What is the alleged reason for their action?

To make the postoffice expenses less than the income.

Does United States make similar rate reductions in rents, teaming, light, heat, etc., charged for by individuals and companies?

No.

Why?

Everyone knows.

Are other postoffice expenses less in same proportion as is the railway pay?

No. In eight years previous to 1908 total expenses grew 93 per cent ($1,000,600,000). The income grew 87 per cent ($89,000,000).

What portion of the expense increase was for railway service?

Only 11 per cent.

What went for rural free delivery in 1908?

$33,935,000, or 34 per cent.

How much for postmasters?

25 per cent, or $25,000,000 of the increase.

Have the postoffice expenses always exceeded the income?

No.

What years has this excess been greatest?

Since the adoption of rural free delivery. In 1900 this service cost $420,000, and the year's postoffice surplus over all the expenses was $5,385,000.

In 1908 rural free delivery expenses had grown to $35,462,000. Other expenses (not including pay to railroads) had grown to $135,804,583, and the postoffice deficit was $17,441,719.

That is to say, the increase in income of postoffice has been all absorbed by increase in rural free delivery and other expenses (not including pay to railroads)?

Yes.

How much have the "Acts" and "Orders" referred to herein taken from the railroads?

About $8,500,000, or 17 per cent of the total received by them in year ending June 30, 1908, for handling the mail and furnishing postal cars.

Is there any justification in such "Acts" and "Orders"?

Not from any point of view. Labor, material and the price of everything have advanced materially. Yet in the face of conditions that, in all fairness should have raised it, railway mail pay is practically the only thing that has been decreased.

A CONTRAST IN POST OFFICE CARS

70 FOOT STEEL POSTAL CAR—PENNSYLVANIA R. R. 1910

40 FOOT POSTAL CAR—GOVERNMENT STANDARD 1885

CO-OPERATION BETWEEN THE RAILWAY OWNER, THE RAILWAY EMPLOYE AND THE RAILWAY USER

BY HOWARD ELLIOTT,
President Northern Pacific Railway Company.

ADDRESS AT THE MONTANA STATE FAIR, HELENA, MONTANA, SEPTEMBER 26, 1910.

In order to consider this question, a brief statement must be made showing what the railway system of the United States is today; what it represents; the work it does, and the work it must prepare to do if safe and adequate transportation is to be furnished to the people of the United States. The railways of the country, in their present form, have been built since the close of the Civil War, or in less than fifty years, and are the wonder and admiration of students of the transportation problem who come here from other countries. There are 234,182 miles of railway, and more than 340,000 miles of track in this country, as compared with a trifle less than 300,000 miles of railway in all the other countries of the world combined. There are nearly 58,000 locomotives; more than 45,000 passenger train cars; nearly 2,200,000 freight and service cars.

On these tracks, and with these engines and cars were run in the year ending June 30, 1909, freight trains for 560,602,557 miles, and passenger trains for 491,903,107 miles, or an average of 2,883,577 miles every day in the year. This is equal to a trip around the world at the equator 116 times each 24 hours.

These trains handled in the year ending June 30, 1909, 217,756,776,000 tons of freight one mile and 29,452,000,000 passengers one mile. The significance of these figures will be better understood by stating that they are the equivalent of hauling a ton of freight 2,419 miles for every man, woman and child in the United States, and giving each of them a ride on a passenger train of 327 miles.

The number of tons of freight moved over each mile of railway during a year is the measure of the freight work performed for the country by the railways. There was

In the United States.............969,000 tons one mile in 1909
In England ....530,000 tons one mile in 1908

In Germany ....880,000 tons one mile in 1908
In France ....497,000 tons per mile in 1907
showing that the American railways are furnishing a greater service per mile of railway than the older countries.

Right here in Montana the Northern Pacific for the year ending June 30, 1910, furnished freight transportation equal to 1,586,801 tons one mile for every mile of its track in the State, over mountains and through heavy snow storms for part of the year. On parts of the main line more than 3,000,000 tons of freight per road mile were moved, or transportation in excess of the average of the United States railways.

NEED FOR INCREASED FACILITIES.

Since 1889 the miles of railway in the United States have increased 52.7%; the passengers carried one mile on those railways have increased 154.8%, and the tons of freight carried one mile 224.3%; the number of employes 116.2%, and the taxes 230.8%.

With 90,000,000 busy people in this country the next 20 years must see a constant addition to the railway facilities of the country if the commerce is to be moved satisfactorily, and the Railway User must see to it that the Railway Owner has sufficient margin to justify the enormous additional investment that must be made in order to provide the needed transportation.

The passenger trains of the United States earned on the average for the year ending June 30, 1908, $1.27 per train mile, and the average cost per train mile for expenses, not allowing anything for taxes, using the total freight and passenger train miles, was $1.47.

From this it is plain that there is no margin in the passenger business for taxes, interest and dividends, and that passenger train service, as a whole, is furnished without profit, and often to the detriment of the freight business, which must be moved promptly for the development of the country.

This country, as it grows in population and wealth wants more and better passenger train service, and better stations, just as it wants more and better hotels and more and better street paving and lighting, more and better restaurants; but in the case of the hotels, paving, lighting, restaurants and many other things, the public are willing to pay more, and do pay more for the better facilities. Not so with the railways; with more trains, heavier trains, faster trains, more luxurious trains, and better track, there has swept over the country a wave of legislation for a 2-cent fare. The 2-cent maximum fare is unjust, and retards the development of the very things the Railway User wants, because it is obvious the Railway Owner must sooner or later stop doing so much work without any margin of profit at all.

In England the first-class passenger rate is 4 cents; second-class 2½ cents, and the third-class 2 cents.

In Germany, the first class is 3 cents; second-class 2.55 cents; third-class 1.79 cents, but the second and third-class accommodations in England and Germany are nowhere near as good as those furnished the traveler in the United States.

In Great Britain the average freight charge for handling a ton of freight 100 miles was $2.31 in 1907 and $2.33 in 1908.

In Germany the average charge was $1.42 in 1908; in France, $1.46; Austria, $1.39; Belgium, $1.22.

The great freight service of the American railways was furnished in 1908 and in 1909—at an average charge of 75 cents for handling a ton 100 miles.

In 1888, the average rate per passenger mile in the United States was 2.35 cents, and in 1908 only 1.937 cents, and yet the accommodations provided have constantly improved in quality.

In 1870, the average rate for handling a ton of freight 100 miles was $1.99, and in 1909 75.4 cents, or a reduction in 40 years of 62%.

The Railway Owner, by his courage, energy and intelligence in adopting advanced methods, has been able to improve the railway system of the United States steadily in the last 40 years and still maintain and operate his property in spite of this reduction in rates. If the Railway User had paid, for the year which has just passed, the same average freight rates as in 1870, he would have paid $2,691,473,751.36 more than he did pay; if he had paid the same average rates per passenger mile as in 1888, the additional payment would have been $147,260,000, the two amounts being greater than the entire earnings of all the United States railways in the last year.

LIMIT OF ECONOMY.

But the Railway Owner is now put to it to maintain and operate his property on the basis of present rates, present wages, present prices for material, present taxes, present rigid government restrictions, and the growing demand of a prosperous people for more and better service.

Railways are using rails of 90 and 100 pounds weight to the yard; freight cars carrying 50 and 60 tons of freight; passenger cars weighing 50 and 70 tons often carrying only a dozen people, or five tons of dead weight for one passenger, and locomotives weighing 300,000 to 600,000 pounds, with 58,000 pounds on a single axle. The Railway Owner can go no farther in using larger tools in his plant and must depend for any further economies upon an improvement in the work of the Railway User and Employe in using that plant. If the Railway User fails to load and unload the cars promptly, if the Railway Employe is careless and inefficient, the railway cannot be used to its full effect.

Now, who is the owner of this enormous and complicated piece of machinery built up in the last 50 years? The best figures obtainable as to the number of stockholders show 440,000, and while the number of bondholders cannot be determined with the same accuracy, information about a few roads indicates that the number of bondholders exceeds the number of stockholders, and that 1,000,000 is not an unfair figure to represent those holding railway securities. Many of these holders are women and children, charitable and educational institutions, National banks, Savings banks, trust companies and insurance companies. The average for each owner of railway property in this country is $13,600. Of course, some individuals hold more than this, and very many hold much less, but the statement that railways are owned and controlled by a few very rich men is not correct. These 1,000,000 owners represent at least 4,000,000 people in the United States whose daily bread and butter depends more or less on the success or failure of the railways.

Now, this Railway Owner, with an average ownership of $13,600, is dependent entirely as to a return on his investment, and as to the safety of his principal, on the honesty, intelligence and efficiency of the Railway Employe, and to the sense of justice and fair treatment of the Railway User. The Railway Owner, if he does not like his investment, cannot shut up shop and wait a while until business is better. He cannot even abandon his business and pocket his loss. He must go on, whatever the conditions may be, with the hope that the ultimate good sense and justice of the

American people will give him even a part of that protection and encouragement that is given to those who may be engaged in agriculture and in manufacturing.

Then, in 1909, there were 8,831,863 depositors in savings banks, having $3,713,405,710 on deposit. In 1908, there were 25,852,405 separate life insurance policies held in this country with a face value of $14,518,952,277. Every savings bank depositor and every holder of a life insurance policy is interested in having railway securities safe and profitable, because the savings banks and the Life Insurance Companies are all holders of railway securities, and anything that affects the welfare of those two great institutions affects millions of people outside of the owners of railway stocks and bonds. In 1909 there was $33,117,068,129 of fire insurance written in the United States and $126,171,492 fire losses paid. The large Fire Insurance Companies, like the large Life Insurance Companies are investors in railway bonds and stocks. The Savings Banks and Insurance Companies must have assets that pay a sure return and that can be converted easily and quickly into cash and their ability to pay depends in part upon the stability and earning power of the great railway corporations.

For the years 1906, 1907 and 1908, complete statistics are furnished by the Commerce Commission. These were three years of fairly good business in the country, when farmers and manufacturers did well.

In round figures, the results to the railways of the country from the transportation of persons and property were:

	1906	1907	1908
Total earnings	$2,325,765,167	$2,589,105,578	$2,394,780,410
Total exp. and taxes.	1,611,662,886	1,828,828,189	1,754,951,949
Net earnings	$ 714,102,281	$ 760,277,389	$ 639,828,461

These are very large sums, but the net earnings only represent on an average valuation of $13,000,000,000, 5.49% for 1906; 5.85% for 1907; 4.92% for 1908—not a very large return if the Railway Owner could take it all, but he must of necessity, use a liberal share of any such net earnings for a multitude of improvements and additions to the railways, for as the Commerce Commission says in its report for 1908, "Every safely administered railroad should recognize the difficulty of bringing operating expenses under control, and in times of prosperity provide against the contingency of reduced traffic.''

The Railway Owner recognizes this, for there was paid for in interest and dividends, in the years named, 1906—$518,893,000 or 3.99%; 1907—$551,129,000 or 4.24%; 1908—$571,114,000 or 4.39%, the balance going back into the property. In fact, in order to keep up a great piece of machinery like the railway, subject to damage in many ways, and needing constant additions, an amount at least equal to 60% of that paid in dividends should be put back out of current earnings into the property each year. How many farmers, merchants and miners in Montana think these returns are attractive enough to justify their engaging in the business?

DIVISION OF EACH DOLLAR OF EARNINGS.

Out of every one hundred dollars of gross earnings of the railways in 1908 there was paid for:

Labor—direct payment	$ 43.36
Labor in materials purchased	7.77
Labor in fuel and oil	6.88
Total for labor	$ 58.01
Fuel and oil—less labor	$ 1.72
Material—less labor	3.33
Hire of equipment and buildings	2.46
Hire of tracks and terminals	4.60
Damages and injuries	1.80
Taxes	3.56
Interest	13.34
Deficits	2.39
Total	$ 91.21
Betterments to property, etc.	$ 4.37
Dividends	4.42
	$100.00

Out of each one hundred dollars ninety-one dollars was paid out for labor, material, taxes, rents, interest, all of which must be paid if the Railway Owner is to keep out of the hands of the Sheriff. The balance, nine dollars was available for improving the property and for dividends and the margin is very small.

THE RAILWAY EMPLOYE.

There are 1,525,000 railway employes including the officers, representing at least 6,000,000 of the population of this country. They are equal, in honesty, intelligence, industry, and character to the average of American citizens engaged in other pursuits. They are trying to do their part in managing and operating this great piece of commercial machinery that the Railway Owner has created. As they are human, they make mistakes, and sometimes forget that they assume an obligation when they enter the railway service, to be honest, fair and loyal to the Railway Owner, and to the Railway User. The great army of railway employes in their efforts to obtain the highest wages possible must remember that there are only 100 cents in a dollar; that it is possible to force wages to a point beyond the ability of the Railway Owner to pay and still maintain his plant for the benefit of the Railway User, and that the constant wage increase has already discouraged the Railway Owner, and will tend to discourage him more unless additional revenue can be obtained from the Railway User. The Railway User often fails to understand the wage situation, and the Railway Employe and the Railway User must remember that in fixing wages they must consider the ability of the business to pay the wages demanded.

In 1908, the official figures show that there were 1,458,244 railway employes receiving $1,051,632,225.00 in wages, or an average of $721.16 per year. For the year 1907, the average pay of railway employes in the United Kingdom was $260.00; in Germany $371.00; in Switzerland $292.00; in Belgium, where the railways are owned by the state, firemen received $15.00 to $23.00 a month, the higher rate only after 15 years service; enginemen from $22.50 a month to $28.00 a month after twenty-four years service; conductors from $15.97 a month to $34.70. The average railway worker in Belgium gets 43 cents a day. Certain classes of American railway employes get more in a month than Belgium railway employes average in a year.

The advances made in wages in 1906 and 1907 increased the pay rolls of the railways about $120,000,000 and increases since then and now under discussion mean $60,000,000 to $75,000,000 additional. These two increases are equal to 7% per year on a capitalization of from $2,500,000,000 to $2,750,000,000, a sum of money that would go a long way in adding to the transportation facilities of the country.

The Railway Employe has a responsibility to the Railway User to be sober, industrious and careful, so as to furnish the best and safest transportation to the public, and he has a responsibility to the Railway Owner to furnish a full day's honest and efficient work for the compensation that he receives, whatever it may be. The industrial supremacy of America cannot be maintained unless that is done, and every patriotic man, no matter what his employment, should stop waste in labor as well as in material, and expect hard work and rigid economy.

Suppose each one of the railway employes should, by better work and greater care, save only 1 cent a day; that would mean for the country $5,566,250 a year, or enough to buy between 5,000 and 6,000 freight cars; or, enough to build 200 miles of branch line railway in Montana. If they could save 10 cents a day, it would mean $55,662,550 a year, which could be applied to adding to the railway facilities in the country.

In addition to the 1,525,000 employes working directly for the railways, there are 2,500,000 in coal mines, steel mills, manufacturing plants, all supplying what is necessary for the railways in their operations, who represent at least 10,000,000 of our total population. So the railway employes, and the employes of the industries dependent more or less on its maintenance on a sound basis represent approximately 16,000,000 people whose rights must be considered.

The railways are the great purchasers of materials of many kinds, and the moment they are forced to stop buying the effect begins to be felt in the forest, the mine, the mill, and the factory.

INTEREST OF THE RAILWAY USER.

Of the 90,000,000 people in the United States, there are, as already pointed out, about 4,000,000 interested directly as Railway Owners, and their dependent families; 6,000,000 as Railway Employes, and their dependent families, leaving 80,000,000 as Railway Users, with an indirect interest in the prosperity of the railway. Some of these 80,000,000 are vitally interested, because they work for industries dependent upon the purchasing power of the railway for their success; others because they have their savings in banks and Trust Companies; others because they hold life insurance policies for the protection of their families, and fire insurance policies for the protection of their homes and business, and all are interested in having enough transportation and good and safe transportation.

The Railway User, however, is too apt to think that his interest lies in having railway rates constantly reduced, railway wages constantly raised, and railway taxes constantly increased, forgetting that it is equally important to him, and really more important, to have the railway system of the United States so handled that capital will feel safe in adding to investments necessary to furnish the transportation that the business of the country demands. Already, in certain parts of the country, the margin between adequate and inadequate transportation is too small. Only last winter, between the Missouri River and Chicago, and in the vicinity of Chicago, the railways could not furnish that prompt and regular service that is essential for a satisfactory movement of the commerce of the country.

Montana is entering upon a great era of development and will need many new branch lines, but suppose that the railways east of the Mississippi River, when your grain and cattle reach there, are unable to handle your product satisfactorily, to the Middle West and the far East! Such failure will affect every farmer in the State.

The railway user needs safe and adequate transportation, and it will be furnished just so long as the business pays. The railway owner cannot constantly be borrowing money for every minor improvement and addition to the property. The cry is sometimes raised that the railways should not make improvements out of current earnings; they should not make all of their improvements out of current earnings, but they should put back into the property every year a substantial amount of their earnings for improvements like better passenger stations, more sidetracks, better rails, better ballast, safety appliances, and other forms of improvement of which the present generation of railway users get the immediate benefit, as well as enabling a higher development of the country for their children and grandchildren.

CO-OPERATION.

The railway owner, the railway employe and the railway user must co-operate, and all must remember the definition: "The association of a number of persons for their common benefit." In the long run it will not benefit the railway user to crowd down rates so low, and raise taxes so high that he takes away all chance of profit from the railway owner. The railway employe must remember that in the long run he will not profit if he crowds up wages so high that the railway owner has not sufficient margin for the development of the facilities along progressive and safe lines. On the other hand, the railway owner must in fixing the rates do so in such a way that a healthy development of the country will be promoted.

Individually, the railway owner, the railway employe and the railway user, when they discuss the subject, are fair and agree there should be fair treatment to all.

There is, however, a school of politicians who make wild and extravagant statements and who are assuming, without knowing the facts, and without adequate study of the situation, that great injustices are being done. It is important for the railway employe and for the railway user to post themselves about this general subject if they are to continue to exercise their present control in the management of the business of the railway owner. His business is now an open book, and every transaction is recorded in plain black and white and reported at frequent intervals to railway commissions, state or national. The charges that he makes for service performed are largely decided by statute or by railway commissions. Many of the rules under which he conducts his business are made by law, or by various boards. The railway user, if he wants the best railways and progressive development of them, must see to it that his lawmakers and his boards of one kind and another are the right kind of men, and that they look at this question, not in a narrow, partisan way, but in a broad, far-sighted manner.

OBEDIENCE TO THE LAW.

On January 16, 1905, Senator Elkins introduced into the United States Senate a resolution asking the Interstate Commerce Commission for a statement showing the work done by that body with respect to formal and informal complaints, hearings, decisions of the court, exorbitant rates and rebates during the preceding eighteen years, or since the creation of the Commission.

On May 1, 1905, the Commission furnished figures showing that the total number of complaints which reached the Commission was 9,099; the total number disposed of through the friendly offices of the Commission 9,054, or more than 99 per cent of the total. The cases appealed by the Commission to the courts were only 45—about one-half of 1 per cent of the total number of cases. Of the 45 cases appealed to the courts by the Commission, only 8, or less than one-fifth, were sustained by the courts, all of which involved unjust discriminations (always a difficult question in our complicated commercial life) and not a single case involved an exorbitant rate. Of the total number of complaints made to the Commission, 8,319, or 91 per cent, were of so simple and unimportant a character that they were disposed of informally.

During these eighteen years the separate freight transactions of the railways in the United States were in excess of 3,000,000,000, or there was one complaint for each 330,000 separate commercial transactions, and not a single serious complaint about exorbitant rates. Certainly a marvelous record of compliance with a law, and one not equaled anywhere in the history of the statutes regulating human conduct—a compliance that should refute completely the idea that the railway business needs some peculiar treatment by law that is not required by other business and of the idea that the railways do not try to obey the law.

The cost to the country of the Commerce Commission in 1888 was $97,867 and in 1909 $988,936.

In the past, complaint has been made because the railways engaged in politics; today, the country is confronting a danger which is just as serious, if not more so, because politics are now taking charge of the railways and other forms of business, and assuming the responsibility of many parts of the management, but with no responsibility for the financial results.

The railway owners, and the railway officers and employes are just as loyal, high-minded, and energetic and industrious citizens of the United States, as a class, as any other body of men in the country. They have a great task imposed upon them, which they are manfully trying to carry out, and at times it seems as if every man's hand was against them.

Edward Everett Hale, one of the grand old men of the nineteenth century, who passed away about a year ago, put into four short sentences some very sound philosophy about life, as follows:

> "Look up, and not down;
> Look out, and not in;
> Look forward, and not back;
> Lend a hand."

Will not greater progress be made in trying to put this great railway business on a sound basis if all who are interested "look up" at the best features of it, and of the men engaged in it, and not assume without knowing that the business is conducted improperly and that the men giving their lives to the work are incompetent or dishonest? Will not the best results come if all "look out" from their own surroundings and see the difficulties confronting others as well as themselves instead of thinking only of their selfish, local advancement? Will not the best results be obtained if all "look forward" with hope to the future instead of repining over the mistakes that may have been made honestly in the past in the effort to put the United States on a sound industrial basis? Better than all, will not the best results be obtained if every one "lends a hand," and helps instead of raising all sorts of objections, many of which are not justified when the facts are known, magnifying the errors and minimizing the good work done?

The future welfare of the railway system of the United States is largely in the hands of the railway user, and what he will do? Will he crowd the railway owner so hard that the latter cannot produce the increasing amount of transportation needed for the free flow of the commercial life blood of the Nation? Then what? The railway user will have several courses open to him. He can have a less rigid system of regulation and government red tape and encourage the railway business and the railway owner to go on as does other business, subject to the great laws of supply and demand, competition and the natural desire of the owner to manage his business in such a way that it will be a success, with the hope of profit, which is the main incentive of all business. Or, he can take over the ownership and management of the railways and become responsible for their operation and for the money needed for additions and betterments to existing properties, and for the building of new ones. In the present state of politics in this country, such a plan is almost terrifying in its possibilities, because the government has not shown that it can do work of this character as efficiently and economically as private individuals can. Government ownership, management and development of the railways would become a matter for the politicians to trade upon. Just recently, in Austria, there has been considerable discussion because the railways were taken over by the State on the theory that better service and lower rates would be given to the public. Now, there is agitation to put them back into private hands for, instead of proving profitable, there is a heavy annual deficit, which the general taxpayer has to make up. The service has deteriorated and railway expansion has ceased.

Or he can continue the present system of rigid governmental control and supervision, and interference with the judgment and management of the owner, which is rapidly having a deadening and discouarging effect on the development of the business, and is preventing those additions and improvements so much needed in a growing country like the United States. Or, he can continue the present system of government regulation and control, but guarantee to the railway owner some minimum return upon his investment, so he will be willing to put money into the business. Such a plan, however, means that the non-user of the railway will be taxed for the benefit of the user.

To my mind the first course, of more commercial freedom, is by far the better for a growing and expanding country like the United States. We have not yet reached the state of perfection, politically or socially, where government ownership and bureaucratic management of the large, complicated and delicately adjusted railway system of the country will be a success. Putting a government uniform on a railway employe does not at once endow him with a new kind of intelligence and supernatural powers, and it will reduce his feeling of responsibility.

If the Railway User and the Railway Employe are not careful to see that justice is done to the Railway Owner, and if he is not protected and encouraged a little, the time is rapidly coming when the Railway User will go to buy some transportation for his wheat, his coal, his cattle, his manufactured articles, and he will be confronted with the statement from the Railway Owner that all the transportation he has has been sold, and furthermore, that he cannot produce any more transportation because he cannot get any more money, and if the Railway User desires an increased quantity or quality of transportation he must organize and produce it for himself. The Railway Employe will find that the monthly pay day is not so regular and certain as it used to be, and that the wages paid are lower than they now are.

The ultimate good sense of the American people and their belief in the rights of property will, in the long run, I believe, prevail over the misstatements and misrepresentations of some public men, who, without careful study and full knowledge of the situation, and without due regard to the effect of their extravagant language, make indiscriminate attacks upon the railway system of the United States, and upon the men who are giving the best that is in them to the work of advancing that system.

RECAPITULATION.

This wonderful American railway system has been created by the Railway Owner and capitalized at from one-half to one-fifth of the European railways. It does twice as much work at rates from one-half to one-third of, and pays wages from two to five times as much as are paid by European railways. The size of the United States and the wide distribution of the products are such that it is necessary to have a large use of the railways and low rates. To accomplish this, there must be an expansion of facilities; the Railway Owner has done his part; further expansion can only be brought about through the help of the Railway Employe and the Railway User.

The Railway Owner, the Railway Employe, and the Railway User form an ''association of persons who should act for their common benefit;'' not for the benifit of one and the injury of the other, but for the common benefit of all. There has just been a meeting in St. Paul where there was much discussion about the Conservation of Natural Resources. It is high time for the Railway User to consider carefully the Conservation of the Railway System of the United States. Common sense, publicity, plain statements of the facts, and justice to all interests, whether individual or corporate, will help to settle this question properly.

HALF SLAVE AND HALF FREE

By H. U. Mudge,
President of the Chicago, Rock Island and Pacific Railway.

An Address Delivered Before the Commercial Club of Topeka, Kansas, April 11, 1911.

I have given some thought as to what it would please you to have me talk about. I am sure you do not want me to talk politics as you have a sufficiency of that by those skilled in the art. I assume that you would prefer that I say something about the railroads, as that seems to be a topic on which almost anyone can talk, and yet, who can talk railroading without at once getting into politics. While I am speaking of the railroads, I wish it understood that I do not speak for them.

The politician tells us that the railroads must be kept out of politics and the railroad men tell us that politicians should be kept out of the railroads. I am convinced that the railroad owner would hail with delight the day on which both are accomplished. But the millennium is not yet here; the politician will find the railroads a fruitful subject for exploitation long after we here tonight have ceased to have an interest in the matter, and I predict that the railroads will be in politics long after the question ceases to be of interest to private capital. If this is a reasonable view, then does it not follow that railroad men ought also to be politicians?

Webster gives two definitions of a politician:

"1. One versed or experienced in the science of government; one devoted to politics; a statesman. 2. One primarily devoted to his own advancement in public office or to the success of a political party."

I do not suggest that railroad men should aspire to the second estate. I believe the field is already fairly well cultivated.

I believe that many of the differences that now exist, or are said to exist, betwen the public and the railroads would have been avoided if railroad men and other business men had been better politicians. The men who operate the railroads have been good soldiers, and in this they are not much different from other business men. They have not been good politicians under either definition.

The country began its transportation career under a competitive system. The enormous natural resources of the country were valueless without transportation facilities. Private capital was much needed, with which to build railroads. The people gave very little thought as to the terms on which this capital was secured, so that it came quickly. They were quite willing to grant franchises, unrestricted as to rates for service, and to donate some portion of their land in order that the remainder might be of value. They were willing to bond the community because the interest on such bonds was a very small matter compared with the increase in the value of the land, and the increase in their earning power, by reason of these transportation facilities.

Competition was depended upon to regulate the charges for transportation, and so far did we carry this idea of competition that, having bonded ourselves to secure a railroad, we proceeded to bond ourselves to secure other railroads to come in and cut the life out of the first one. Under this fierce competition, we built up the greatest transportation system, with the lowest freight rates anywhere in the world; a transportation system that furnishes employment to more than one and one-half million of people, at the highest rate of wages in the world, but, as is always the case with unrestricted competition, it bred many discriminations,—discriminations between individuals and between communities.

The sale of transportation was, under this system, handled much the same as the sale of any other commodity, *i. e.*, on the wholesale and retail plan. The shipper who purchased transportation in large quantities was able to practically name his own price. Some of them were not very modest in their demands.

After about forty years it dawned upon the American people that, in order to do away with these discriminations, some form of regulation of rates and effective competition in rates could not travel together. The abolition of the secret rate meant the abolition of rate cutting. There can be no competition in rates when you are required to give your competitor thirty days' notice of your intention to cut the rates.

In its first effort at rate regulation, Congress apparently had no intention of going farther than to prevent discriminations between communities and individuals. The measure was altogether a very weak effort, but even in this law it was thought that Congress had exceeded its right under the Constitution; that the mere right to regulate commerce among the states did not give it the right to prescribe rates for service, and the gentlemen on both sides of the controversy, who were "well versed in the lawlessness of the law," took many years in which to settle this question, and some of them are not yet convinced.

I believe most railroad men now think that it would have been better for the railroads if the federal government had claimed the right to regulate all freight rates and that the railroads had conceded this from the start, but corporations and governments, as well as individuals, must learn by experience. We are not usually willing to accept, as conclusive, the experience of others.

Amendments have been made to the law until it would seem that we now have in the Commission a regulating body that ought to be effective, but there seems to be still a very weak point, and that is, that the only method provided for leveling rates between communities is to level them down, regardless of whether the rates are of themselves too high; in other words, the physician is limited to "bleeding" as a remedy.

We have now provided machinery for abolishing discriminations, rebates, etc., but we are now confronted with a new theory, viz., that even if rates are uniform and fair within themselves, they ought to be reduced so that the income of the roads shall be only sufficient to pay a fixed return on the physical value of the property, in other words, that railroad stocks shall be taken out of the field of speculation. This, I think, would mean that investors would demand bonds instead of stock. If the return is to be limited, they will insist upon some security, and we will be dependent entirely upon borrowed money for our improvements with the result that our fixed charges will increase very fast, and finally there will come a time when we cannot meet them.

I do not object to the physical valuation of railroads. I know that in the aggregate, the rates would have to be increased to pay a fair return, but I doubt the wisdom of limiting the earnings of the roads in this way. I think if it is done we will soon awake to the fact that having already eliminated competition in rates, we would by this method also eliminate competition in service.

There is now no difference of opinion as to the necessity for regulation; there is still a serious question as to the extent to which we can go with profit to the country, and as to the best method of doing it.

Admitting that the patient needs treatment, shall we employ 47 doctors to prescribe for the 46 different sections of the system, or shall we have one physician, or one set of physicians, for the whole system? If we employ the 47 doctors, and "bleeding" is to be the only remedy permitted, who will set the limit to which this treatment may go?

I have an abiding faith in the ultimate fairness of the American people and I know that the matter will be settled right, but I think it is due the people that railroad men and business men do a little thinking about these matters in advance, rather than after action has been taken.

There is no question in my mind but that this entire matter would have been placed under the control of the federal government and the railways would have been classed with the waterways if they had been in existence at the time the Constitution was made. Now that they have practically displaced the interior waterways, the reason for placing their regulation under the general government would seem to be more important than it was in the case of the waterways.

I am here reminded of an incident that is recorded in the archives of the Rock Island Company. This company was the first to reach and bridge the Mississippi River. There was much opposition on the part of the river shipping interests who sought to prevent the bridge. Abraham Lincoln was at that time a Rock Island attorney and in his argument said: "It is not at all improbable that the traffic crossing this bridge may, at some future time, be even greater than that passing up and down the river." How correctly he prophesied you will see when I tell you that the average number of freight and passenger cars now passing over this bridge is about 1,400 per day, and there are now some twenty railroad bridges over the Mississippi River. In this forecast, however, the prophetic vision of this great man was not as clear as when he stated a short time afterward in his great speech at Freeport, Illinois, that "this country cannot endure half slave and half free."

Here was a problem that each state could not solve for itself. The railways are the commercial arteries of this country. They are the means of communication, or intercourse, which commercially connects every individual in the country with every other individual. These arteries do not begin and end at state lines. We guarantee under the Constitution that commerce among the states shall be free and uninterrupted. How can this be accomplished so long as the arteries of commerce are regulated by a multiplicity of commissions? How can the Interstate Commerce Commission say that one rate is fair and remunerative if a different rate is to be prescribed by other authority for traffic moving over the same rails and, perchance, in the same train? How can the Interstate Commerce Commission build up its patient if "bleeding" is to be the only remedy permitted?

Gentlemen, the railroads of this country cannot endure half slave and half free.

WATERWAYS

THEIR LIMITATIONS AND POSSIBILITIES

BY FREDERIC A. DELANO,
President of The Wabash Railroad.

An Address Before the National Rivers and Harbors Congress
of the United States, at Washington, D. C.,
December 8, 1910.

There is no more important subject today than that of waterways. It involves great questions of public policy, and every true and loyal citizen of the United States is interested in seeing those questions settled right;—settled without reference to personal bias or party prejudice, and in a way justified by the conditions. All the facts upon which opinions must be based are facts for the Engineer and the Economist to determine after careful investigation. It is important that those facts should be accurately determined and correctly recorded. Therefore, in my discussion of this subject I shall endeavor to keep in mind these principles.

I do not believe that the development of waterways, solely in the interest of the general public, would hurt the railways. Even if I thought otherwise, I hope that I should have enough public spirit to advocate that which I believe to be for the general good. Whatever is for the public good ought to be done even if in consequence some special interest suffers. For the same reason that I do not think railway men should discuss such a large question of public policy from the railway standpoint, I do not think shippers should discuss it merely from the shipper's standpoint. The question that ought to be considered by all is whether development of waterways is the best way to secure cheaper and more adequate facilities for transportation; and when I say "cheaper," I have in mind the entire economic cost of transportation, including not only the rates that the shipper pays to the owners of the boats, but also what the public pays in taxes for the improvements and construction of the waterways.

When we consider the cost of railway transportation, we do not consider merely the cost of moving the engines and the cars. We consider also the cost of providing and maintaining the roadway, the stations and other structures. Obviously, all costs incidental to the soliciting of freight, insuring it in transit, interest on capital invested, and charges for replacements and betterments are applicable to waterways as well as to railways; and we must not deceive ourselves by reason of the fact that some of these expenses are borne by the general government, instead of by the traffic moved.

The subject of waterways in the United States naturally divides itself into:

I. Trans-Oceanic Waterways;
II. Coastwise Routes;
III. The Great Lakes;
IV. Canals Connecting Great Waterways;
V. Navigable Rivers; and
VI. Canals and Canalized Rivers.

I shall try to say something of each.

TRANS-OCEANIC WATERWAYS.

Harbors.

The question of developing trans-oceanic waterways is mainly one of deepening harbors. Sea-going steamships have attained such draft that no harbor with a depth less than twenty to forty feet can accommodate the largest of them. Any place that is to remain or become a great port must have a harbor dredged to these depths, for the large steamships make for economy in transportation, and only to such ports can the large steamships come.

The development of harbors seems a proper, and even necessary function of the general government. Every commercial interest in the country (including railways) benefits by it; and for this very reason, private capital would have no incentive to engage in it, even if it were given the opportunity.

While it is a proper function of the general government to develop harbors, it certainly is not a proper function for it to undertake to develop them at all the cities that aspire to become great ports. Great ports are created by a combination of natural and commercial conditions, by the existence of good natural harbors and the focusing at them of rivers or railways, or both, capable of carrying large traffic to and from them, and of a spirit of trading enterprise that attracts to them over the rivers and railways from the inland territory or "hinterland" and over the ocean from other directions, a large commerce. The government cannot merely by dredging a harbor make a city located on it a great port; and, therefore, expenditures should be almost entirely confined to places where the combination of conditions mentioned is found. Repeated attempts have been made to create ports by government fiat and cash, merely because members of congress have had enough "pull" to secure by "log-rolling" methods the necessary appropriations; and a great deal of money has been wasted which if it had been spent where natural and commercial conditions warranted it, would have done much good.

The increasing capacity and draft of sea-going vessels which necessitates the dredging of harbors to great depths, has a most important bearing on the question of the development of inland waterways. It is sometimes contended that we should dredge our rivers and dig our canals so wide and deep that vessels can carry goods directly and without transhipment between cities situated on them and all the ports of the world. Some of the people of Chicago have visions of ocean vessels loading in their harbor, steaming down through the drainage canal, the Illinois river and the Mississippi river, and thence to Europe; also through the Panama canal to the Orient; or by the Great Lakes and St. Lawrence canals, to Europe. Such thoughts are idle dreams, and the trend of economic conditions in ocean transportation make any such suggestions increasingly impossible. It might, for example, have been considered with the class of vessels which were used on the ocean twenty-five or more years ago. It cannot be considered with the class of vessels which are economical and necessary today, for, regardless of the relative depths of waterways, vessels which must withstand the buffetings of the waves and storms of the ocean must be built much more strongly and, therefore, at much greater cost than vessels for inland carriage. The average cost of an ocean steamship per ton of capacity is $71.00; of a steamship on the Great Lakes, $41.50; and of river tow boats and barges capable of carrying 10,000 tons of freight on an 8½ ft. draft, only $12.00.*

A lake or ocean vessel is poorly constructed for navigating a canal or tortuous river, even with a moderate current; its ratio of length to beam is too great and it cannot be maneuvered at slow speed. Furthermore, a vessel costing $71.00 per ton of capacity cannot be operated economically where it must, perforce, be navigated slowly.

COASTWISE ROUTES.

Trans-oceanic waterways are mainly connections, and not competitors of railways. The relations between the coastwise routes and the railways are widely different. In some cases, coastwise water lines compete with railways; in others, rail-and-water lines compete with railways; in others again, rail-and-water lines compete with rail-and-water lines.

It is often said that our merchant marine is declining. This statement is not strictly correct. The part of our merchant marine engaged in foreign trade is declining, the reduction in its tonnage between 1889 and 1909 being from 999,619 to 878,523 tons. But the tonnage engaged in our coastwise traffic increased between the same years from 3,211,416 to 6,451,042, or over 100 per cent. This increase is mainly attributable to three things:

(1) To the monopoly of the coastwise traffic which the government gives to American vessels, but for which it is improbable that our ships would have been able to meet the competition of foreign vessels any better in our own waters than the high seas.

(2) To the fact that many large industrial concerns have acquired and operate lines of boats to handle their own traffic; and

(3) To the fact that many railway lines have acquired coastwise steamship lines, or at least controlling interests in them, make favorable through rates and issue bills of lading in connection with them, and use their own soliciting staffs or other well developed soliciting organizations to get traffic for them.

There is much criticism of the railways for getting control of steamship lines engaged in coastwise and lake traffic. But experience indicates that the control of such steamship lines by either large industrial corporations or railways is requisite to the development of a large water traffic. A railway can go anywhere that traffic is available. A steamship line can skirt only the fringe of the country, and can touch that fringe at only a few places, the number of harbors capable of receiving a good-sized boat being much smaller than the number of stations on a railway. The amount of freight originating at the relatively few places at which a steamship can be docked is comparatively small. Before it can get a large and regular traffic, some agency must cause commodities to be laid down at places where it can pick them up. A large indus-

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*NOTE: A modern freight car costs approximately $20 per ton of capacity.

trial corporation, such as the Standard Oil Company, the United Fruit Company, or the United States Steel Corporation, can cause a great amount of freight to be concentrated at points where its own boats stop. A railway with a soliciting staff represented at every point on 2,000 or 5,000 or even 10,000 miles of line, may similarly cause enough freight to be concentrated at certain places to make profitable the regular operation of large steamship lines from those places. But—except under conditions peculiarly favorable to water transportation—a steamship line which has not the co-operation of a large industrial concern or a large railway cannot get traffic with such regularity and volume as to enable it to compete effectively, permanently and on a large scale against well-organized railways having strong soliciting staffs and giving regular and dependable service.

In an admirable book by Professor Smith, of the University of Pennsylvania, called "The Ocean Carrier," the great vicissitudes surrounding ocean transportation are pointed out. The business is essentially very hazardous and must either be done on a very large scale in order to distribute the risk, or be backed by very powerful corporations. Marine disasters or "lean" traffic years are overwhelming to any small vessel owner, even though the profits of an occasional good year are sometimes very large. Coastwise water transportation, like other ocean transportation, is cheaper than rail transportation, and when its lower cost is supplemented by efficient steamship management it is of great economic benefit. In Europe it is common for the railroads to make practically as low rates per ton mile for short distances as for long distances. While this does not agree with the economic principles of transportation, it serves to make the railways valuable as feeders for the waterways, because the railway with relatively high long distance rates cannot compete with the waterway, whereas the comparatively low *short* distance rate enables them to act as assembling agents for the waterway.

One thing that has hindered the development of the coastwise traffic has been the failure of the municipalities at most ports to provide good and adequate docks and other necessary facilities. It does not seem a proper function of the general government to provide these things. It should be left to the cities themselves or to private enterprise under regulation and control by the cities. If the cities do not provide them and do not encourage and regulate their development and use by private corporations, the public cannot consistently criticise private corporations for so developing and using them as to make them primarily profitable to those who furnish the capital.

THE GREAT LAKES.

The most rapid growth in our water-borne commerce during the past twenty years has been on the Great Lakes. Between 1889 and 1906 the gross tonnage of vessels used on the Mississippi and its tributaries increased 31 per cent; on the Atlantic Coast and Gulf of Mexico, 82.5 per cent; on the Pacific Coast, including Alaska, 133.3 per cent; on the Great Lakes and the St. Lawrence river, 160 per cent; and meantime the gross tonnage of the vessels used on our other inland waterways declined 74 per cent. During the same period the net tons hauled on the Great Lakes and the St. Lawrence river increased 200 per cent; on the Atlantic Coast and the Gulf of Mexico, 166 per cent; on the Pacific Coast, including Alaska, 57 per cent; and the net tons hauled on the Mississippi river decreased 6 per cent, and on all other inland waters, 65 per cent. The average gross tonnage per vessel on all our coastwise and inland waterways increased from 274 to 345 per vessel, while on the Great Lakes it has increased from 336 to 800 tons per vessel. The average tonnage per vessel on the Great Lakes is larger than on any other of our waterways, it being but 385 tons per vessel on the Pacific Coast and but 242 tons per vessel coastwise on the Atlantic Coast and Gulf of Mexico. Only on the Great Lakes does the average tonnage of steam vessels exceed 1,000 tons. The rapid growth of commerce on the Great Lakes has been largely due to the wise policy of the Government in developing harbors and in deepening the Sault Ste. Marie canal. It has also been largely owing to the course of large industrial corporations and of the railways in acquiring control of or putting on the Great Lakes large steamship lines. These things have contributed to its increase for precisely the same reasons that they have helped to stimulate our coastwise traffic.

You may be disposed to reply that the important thing that has built up the coastwise and lake traffic has been the very low rates which the water lines have made. It is true that their rates have been much lower than those by rail. But the fact is that a water line which seeks to attract business from a competing railway merely by low rates is very apt to get worsted. This is illustrated by the existing conditions on the Great Lakes. The report of the Bureau of the Census on Transportation by Water, issued in 1906, from which many of the statistics that I have cited are derived, shows that the total shipments on the Lakes in 1906, excluding bunker coal, were about 73,000,000 tons, and that of this amount about 43,000,000 tons were iron ore or its products, practically all of which, of course, was carried in vessels owned by large industrial corporations—the steel manufacturers. Of the rest of the traffic, very much the greater part was carried in vessels owned by coal operators, lumbermen, and railways, leaving only a comparatively small part for other boat lines. Practically all of the shipments of package freight were carried by railway boat lines. While the traffic on the lakes has been increasing so rapidly, that of the railways running between the same points that are reached by the boats has increased even more rapidly. Why have not independent boat lines taken the business away from the railways and the water lines they control? There are independent water lines and they make low rates. The answer is that the railway (and substantially the same thing is true of water lines controlled by railways) has a soliciting force and offices everywhere that are accessible to the shipper and when he delivers it goods it issues him a bill of lading which is a merchantable and bankable paper and almost absolutely protects him against loss of and damage to his goods, while when he wants to make a shipment by an independent boat line he has to go and hunt up a captain who may have two or three boats available, and who will give him a mere receipt for his goods which affords him little or no protection against loss and damage. To be on the safe side, he must incur the trouble and expense of insuring the goods while in transit. Even if he can save a small amount, this will not compensate him for the trouble and time of hunting for someone to carry his goods and for the risk incidental to water transportation. Indeed, it is safe to say that not to exceed twenty per cent of the tonnage carried on the Great Lakes is carried by *common carriers.* The railway steamship lines, and half a dozen or more independent lines, are common carriers; but the great bulk of the tonnage is carried by vessels owned by the shippers or by "tramp" steamers that are chartered to the shippers.

As already stated, the railway has the great advantage that it can send for goods anywhere, pick them up anywhere, and carry them without transhipment to any point to which the shipper may want them to go. No independent boat line can attract business away from a steamship line owned by the same industry whose commodities it transports; and it is also difficult, although not so hard, to attract traffic away from a boat line owned by a railway, because the railway can to a very large extent influence the routing of traffic which may be carried by its boat line. Even if an independent boat line builds up a good business, there is nothing to prevent some rival boat line coming in, cutting rates, and taking a large part of it away; for it is easy for a group of men to get together a fleet of vessels by charter and form a line to compete for any traffic; but the vulnerability of independent boat lines tends to prevent them from being established. In other words, the very freedom of waterway competition militates against waterway competition.

It is chiefly due to these conditions that the boat lines on the Great Lakes have in the main passed into the control of the large industrial corporations and the railways. One of the results of their control by these large interests is that the public has to rely for water transportation mainly on the lines controlled by railways; for the steamships owned by the large industrial corporations are private carriers and handle only commodities shipped by their owners. Therefore, if the public gets any of the benefit of the low rates they make, it is only in the form of low prices for the commodities they sell. Whether the benefit is passed along to the ''ultimate consumer'' in this form, I must leave to your own observation.

CANALS CONNECTING GREAT WATERWAYS.

No wiser and more effective expenditure of public money for waterways could be made than for the purpose of deepening and widening rivers and digging canals to connect large bodies of water when the distance between the waterways is not too great. The best example in the world of such connecting canals is the Sault Ste. Marie canal. The American canal at Sault Ste. Marie was first opened to navigation in 1855. During the forty years to 1895, 101,244,462 tons of freight passed through it. During the next 11 years, ending in 1906, after the canal was improved, 343,288,393 tons passed through it. The development of this canal, which is 2.7 miles long and 25 feet deep, has cost $13,000,000, or $4,800,000 per mile. Its great value consists not merely in its ability to handle a large traffic, but in the fact that it makes more available and useful the great waterways it connects. Its cost was large, considering its length, but all the great ship canals have cost very large sums. The Suez canal, which also was built to connect great waterways, is nine miles long, thirty-one feet deep, and cost over $1,100,000 per mile. The Kaiser Wilhelm canal, 61 miles long and 29½ feet deep, cost $656,000 a mile. The Manchester Ship canal, 35.5 miles long and 26 feet deep, cost $2,100,000 per mile. These very large figures show that the longer it is necessary to make a ship canal to render it useful, the more dubious becomes the desirability of building it. When it must be made more than a comparatively few miles long, its cost is apt to become so very great as to make it an entirely uneconomical means of transportation if to the rate paid by the shipper is added an allowance for interest, maintenance and depreciation on the original undertaking.

This subject should not be passed without mentioning our splendid undertaking at Panama. True, this undertaking may cost from eight to ten millions per mile of canal, but as an undertaking for the benefit of the world at large, it is one of the greatest ever conceived. No one can foresee the economic effects which may flow from the Panama canal. We can see its military value to us. We can see that it will bring the Pacific Coast nearer to our Atlantic seaboard; but, by the same token, it will also give our European competitors easier access to our Pacific markets. We can readily see that it will be an advantage as a new route for the manufacturing centers on our east coast to the west coast of South America, and between our own west coast and the east coast of South America. Incidentally, an interesting effect of the Panama canal will be to sound the death knell of the last great sailing vessel world route—that from San Francisco to Europe. The tramp steamer plying through the canal will certainly put the last of these "wind-jammers" out of business.

NAVIGABLE RIVERS.

A widespread public demand for the general improvement of the navigable rivers of the United States has been voiced within recent years. This demand is generally premised on the assumption that the greater commercial use made of the rivers of Europe is due to their having been developed by the governments to a greater extent than our rivers have been, and that similar action by our government is necessary to make our rivers equally useful transportation facilities. But the fact is that our navigable rivers in their present condition are better able to carry a large traffic than are those of Europe. The maximum depth attained on the rivers and canals of France is 8.5 feet, while most of the traffic is carried on water varying in depths from 1.5 to 5 feet. The depths of the rivers in Germany vary from 3 to 6 feet, except on the lower reaches of some of the larger streams, where there are depths of from 8 to 10 feet; and the canals and canalized rivers vary from 2.6 feet to 10 feet, 4 to 6 feet being most common. The Rhine and the Elbe, on which 67 per cent of Germany's water commerce is carried, have together only 617 miles of channel, with a depth of as much as 4½ feet, which is the minimum depth of the Mississippi, the Illinois river and the Illinois state canal between Chicago and New Orleans, a distance of 1,657 miles. There are in the United States forty streams, with a length of 2,600 miles, which have a depth of 10 feet; and seventy more, with a length of 3,200 miles, which have a depth of 6 to 10 feet. Practically all the traffic on the waterways of Belgium, France and Germany is carried in shallow barges varying in capacity from 100 to 1,000 tons. One thousand ton barges are practically confined to the Rhine in Germany and the Seine in France. The great bulk of the traffic is carried in barges having drafts of 2 to 6 feet and capacities of 150 to 600 tons, and which are commonly towed in trains at from 2½ to 4 miles an hour. It would be perfectly feasible to handle a big traffic with such barges as these on a very large proportion of the rivers of the United States. If some of our rivers, such, for example, as the Hudson, which has ample depth and width for navigation by large vessels and which runs in the direction of large currents of traffic, were located in Europe, they would be bearing a heavy commerce.

The main reason why the commerce on our navigable rivers is so much smaller than on those of Europe is not that our rivers are potentially less efficient facilities of transportation, but that our railways are more efficient than their railways and make lower rates. The average rate per ton per mile on the railways of France is 14 mills and on those of Germany, 13 mills. It is not possible to state the average rates per ton per mile on European waterways, but the figures given in the report of the British Royal Commission on Canals and Waterways, which was published early in the present year, indicate that the average rate per ton per mile on the waterways of Germany is about 5 mills and on the waterways of France about 6 mills. This takes no account of the fact that in Europe the haul by water between any two points is usually considerably greater than the haul by rail. If the water rates were estimated on the basis of the shorter distances by rail, they would be higher, but they would still be much lower than the rail rates. The governments of continental Europe so regulate the rates of the railways as to make them rather inflexible, while the boats are allowed to give all the flexibility to their rates necessary to secure business. In view of these differences in the water and rail rates of Europe, it is not surprising that the boats on the rivers, despite their relative shallowness, have been able successfully to compete against the railways.

Railway rates in the United States are very much lower than they are in Europe. The average railway rate per ton per mile in this country in 1909 was but 7.63 mills, and the rates on roads having great densities of traffic, or handling mainly cheap and bulky commodities, are much lower.*

The average rate per ton per mile on all traffic of the Pennsylvania Railroad, for example, is 6.3 mills; of the Illinois Central, 5.8 mills; of the Lake Shore & Michigan Southern, 5.27 mills; and of the Chesapeake & Ohio, 4.33. Furthermore, our railways have been allowed in the past freely to adjust their rates so as to meet water competition, and even destroy it.

The policy of both the railways and the government of the United States in reference to railway rates recently has been changing to a marked degree. Until lately, the tendency of railway managers was voluntarily, or under the stress of fierce competition, to reduce rates to a lower and lower basis. This unrestrained competition caused unfair discrimination between localities. The efforts of the government and of the railways to stop unfair discrimination necessarily have reduced competition, and thereby checked the downward tendency of rates. The increasing costs of railway operation have had a similar effect. If railway managers are allowed to carry out their present plans, rates will be advanced somewhat. Furthermore, the Mann-Elkins act has amended the Interstate Commerce act in ways that will tend to prevent the roads from meeting water competition as they have in the past. They often have made lower rates for longer, than for shorter hauls, in order effectively to meet at points on navigable rivers, competition which did not exist at intermediate points. If they had been required to reduce all their rates to the same basis as those made to meet such competition, they would not have tried to meet it. Under the revised Interstate Commerce act the Commission is given wide discretion to determine when a railway may make a lower rate for a longer haul; and according as the Commission exercises its discretion will depend how and to what extent the roads may in future meet water competition. Another provision of the Mann-Elkins act absolutely prohibits a railway from raising a rate that has been reduced to meet water competition, unless since the rate was fixed some change in conditions has occurred other than the elimination of water competition. This restriction on advances in rates is sure to operate as a hindrance to their reduction. With railway rates tending upward, rather than downward, and also tending to become less flexible, it is quite possible that the opportunity for the development of traffic on our navigable rivers is improving.

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*NOTE: This oft-quoted figure of the average ton mile in this country is made up by taking the average of all the tonnage of the country. It includes the movement of less than carload package freight; the movement of business over mountain ranges where the rates are necessarily high; it includes the movement of live stock, perishable freight, citrus fruits, and many high class commodities on which speed is a requisite.

CANALS AND CANALIZED RIVERS.

A great many intelligent persons concede that the traffic on the inland waterways of the United States, except the Great Lakes, has declined, while that on the waterways of Europe has increased, because of the cheap and superior service of our railways, and contend that we can make our waterways successful competitors of our railways only by making our waterways greatly superior to the waterways of Europe. They, therefore, advocate digging canals and canalizing our rivers to depths exceeding those attained on such waterways in any other country. One of the plans is for a 14-foot waterway from Chicago to New Orleans. It is questionable if the results would be worth the cost. The aim of public policy should be to cause the provision of such facilities of transportation as will be able to handle our commerce at the least economic cost; and in economic cost I include the taxes the public would have to pay in order to provide and maintain deep waterways. The report of the British Royal Commission shows that the expenditures of France on its rivers up to 1905 averaged $30,000 a mile, and on its canals, $102,675 per mile. The average density of traffic on French waterways in 1905 (that is, the number of tons handled one mile per mile of waterway per year) was 420,000 tons. Germany had spent on its waterways an average of $30,300 per mile, and on its canals, an average of $42,250, and the average density of traffic on them was 1,500,000 ton miles. The canalization of the Main cost $95,000 per mile. The construction of the Teltow canal cost $390,000 per mile. The interest and maintenance charges paid by the government of France on its waterways amounted to 4.2 mills per ton mile of traffic handled, which, added to the average rates which the shippers paid to the boats, *makes the economic cost of water transportation 10 mills.* The interest and maintenance charges paid by the government of Germany amount to about .84 mills per ton mile, which, added to the average rate of 5 mills, makes the total economic cost of water transportation almost 6 mills. The greatest density of traffic on any river in Europe is on the Rhine, where it amounts to 11,400,000 ton miles. The density on the Elbe is 5,800,000 ton miles. To get the depths advocated in this country would require very much greater public expenditures than those that have been made in Europe. Indeed, it might in many cases involve expenditures approximating those for the Kaiser Wilhelm and the Manchester Ship canals, the former of which cost $656,000 per mile, and the latter, $2,100,000.

The capitalization of the railways of the United States is $59,259 per mile of line, and this, of course, includes equipment and terminals, as well as roadway. The number of tons carried one mile per mile of line by our railways in 1909 was 953,986. The density of traffic of some of our large railways rival those of the greatest waterways of Europe. The number of tons hauled one mile per mile of line by the Delaware, Lackawanna & Western in 1908 was 3,886,814; by the Philadelphia & Reading, 4,164,131; by the Pennsylvania Railroad, 4,723,834; and by the Bessemer & Lake Erie, 5,564,712, or over 13 times as much as the average density of traffic per mile on the waterways of France, and almost four times as much as on the waterways of Germany.*

These figures indicate to my mind that if, in order to provide inland water transportation which will be able to compete effectively against the railways, it is necessary to dig canals and to canalize rivers to depths of 14 or 20 feet or more, we might better forego having effective water transportation facilities and use our money to provide facilities for transportation by rail.

To dig a waterway 14 feet deep would be to provide one that would not be any more useful than the Mississippi river already is for most of its length and than numerous other streams are. For over 95 per cent of the vessel tonnage on the Great Lakes draws over 14 feet of water, and over 80 per cent of this draws over 18 feet. It is evident, therefore, that lake vessels could not be used on a 14-foot waterway, and, of course, ocean steamships could not be used where lake steamships could not be. Even if the Lakes-to-the-Gulf waterway were made sufficiently deep for lake vessels, and it were economical for them to use it, all water transportation on tributary streams would have to be carried in shallower draft vessels, requiring transfer. Would it not be better to serve the entire Mississippi river basin with tow boats and barges which, like the much abused freight car, could go anywhere within the sphere of navigability, say 5,000 to 8,000 miles? Isn't the real problem to find an economical vehicle of transportation adaptable in a large river system like the Mississippi river and its tributaries; a vehicle which shall do for that river system what the freight car does on our system of railways?

The stern reality is that even if a 14 or a 21-foot waterway were dug, it would never be used by deep draft boats. As I have already said, a large vessel cannot be profitably navigated on a narrow channel, because the interest on its high cost makes it uneconomical. Colonel Symons estimated that it would cost 38 per cent more to carry grain with a lake freighter on a ship canal than it would with a tow boat and barges, and it was in consequence of his investigations and conclusions that the state of New York decided to deepen the Erie canal only to 9 feet, instead of making a ship canal of it. Colonel Symons' estimate did not allow for the greater cost of building and maintaining ship canals, but referred only to the expense that would be incurred by the owners of the boats. The operation of a deep draft vessel in a river channel having any considerable currents might be even more expensive than on a ship canal.

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*NOTE: A density of three million tons of freight per mile of road on single track lines is not at all uncommon in the United States, and this movement is in addition to a very considerable passenger traffic.

Furthermore, I assume that no one would advocate making not only the Mississippi, but all of its navigable tributaries, 14 or 20 feet deep; yet if the Mississippi were made a deep waterway while streams emptying into it were not, even if it proved practicable to navigate deep draft vessels on the Mississippi, they could not be navigated on the tributary streams, and then one of two things would happen—either the vessels in which goods were loaded on the smaller streams would be sent through to destination with the goods—in which case the deep draft vessels would not have them to haul—or the goods would have to be transferred to the deep draft vessels, and transferring goods from boat to boat is as expensive as, and often even more expensive, than transferring them from car to car. It seems to me that to develop a waterway system in this way would be like building the main line of a railway with a broad gauge and the branches with a narrow gauge. So far as I can learn, it is the opinion of practically all of the United States army engineers who have investigated the subject, that a tow boat with 6 to 9 feet draft, towing barges with a combined capacity of 8,000 or 10,000 tons, would be able to handle traffic cheaper on the Mississippi river, even if it were deepened 14 feet or 21 feet, than could a lake vessel with a deep draft; and the tow boat and barges would be able to navigate many of the shallow tributaries as well as the Mississippi, which would avoid the cost of transferring freight originating on the branch rivers. Needless to say, the cost of dredging the Mississippi river and its tributaries to a minimum depth of 6 feet or even 9 feet, and maintaining that depth, would be very much less than the cost of digging it to a uniform depth of 14 feet. Boats having a draft of 25 to 30 feet can now be taken from the Gulf of Mexico 270 miles to New Orleans; boats of a draft of 9 feet, 840 miles further, to Cairo, Illinois; and boats of 8 feet, another 182 miles from Cairo to St. Louis; and it is stated by the board of army engineers that the Mississippi and the Illinois rivers and the Illinois state canal from St. Louis to Chicago are now able to accommodate vessels having a draft of 4½ feet. It would seem, therefore, that all that reasonably could be asked, or that ought to be asked of the general government, so far as our navigable rivers are concerned, is that it shall dredge them to depths sufficient to accommodate tow boats and barges such as can now be operated on the greater part of the Mississippi river drainage system. To do more than this would involve an expenditure which would not be justifiable—which, in other words, would not make the *total* cost of water transportation less than it is by rail, whether it made it cheaper for the shipper or not.

If the government provided such channels as I have indicated; if the municipalities or private corporations provided modern and adequate water terminals; and if the water lines made rates, gave service, and formed soliciting staffs adapted to competing effectively with the railways, the water lines on our rivers would be as well situated to compete with railways as are those on any waterways in the world, except, of course, the oceans and the Great Lakes; and unless good water terminals were provided and the steamboat companies formed soliciting staffs, issued bankable and negotiable bills of lading and in other ways gave service which was as good in proportion to the rates charged as that of the railways, they would be as unsuccessful in competing for business, even if the government dug the rivers 20 feet deep, as are the independent boat lines on the Great Lakes now in competing with the railways or with the steamship lines owned by the railways and large industrial corporations.

I do not say that if all these things were done, river steamships would be able to compete successfully against the railways, and I feel very sure that if the water lines were subjected to the same kind of regulation as the railways are, they would continue for an indefinite time to be unable to compete with the rail lines.*

I merely say that under any circumstances *these* are conditions that must be met if our *inland waterways* other than the Great Lakes are ever to compete successfully against the railways. Whether, when the results that would be obtained are so entirely problematical, it is worth while to go on and spend millions in dredging the rivers and equipping water terminals, is for the public to decide.†

Up to 1907, the Government had spent over $208,000,000 on the improvement of the Mississippi Valley waterway system alone. Between 1880 and 1906, canals and canalized rivers having a length of 2,841 miles, which has cost $73,168,000 were abandoned. Up to that time our total expenditures on canals and canalized rivers had been $283,208,863. The total Congressional appropriations for the survey, improvement and maintenance of harbors and waterways had been $552,943,525, and many millions of dollars have also been spent by the various states. We all know that a large part of these expenditures has been unwise, and certainly before expenditures are entered on which would be very much greater than any made in the past, the projects on which it is proposed to make them should be studied to much better purpose than like projects have been in the past.

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*NOTE: Although I have never seen the statement made, I believe it is a fact—and one worth determining by careful test—that it takes less power to move five thousand tons, or ten thousand tons of freight loaded on cars, on a railroad the grades of which do not exceed three-tenths of one per cent, than to move the same tonnage on a canal or canalized river. Train resistance on a smooth and level track is less than the resistance of moving a boat through water.

The reason that the public have been misled as to the comparative cost of rail transportation and water transportation is that in the case of rail transportation the shipper pays the entire cost, including terminal service, and on top of this cost, a profit to the transportation company, whereas in the case of water transportation, the shipper pays only the bare cost of carriage, and no interest on the money invested in the waterways, in the harbors and terminal improvements, nor in the maintenance and upkeep of the waterways.

Furthermore, the interruption of water transportation in our Northern waters is more than a serious inconvenience. It puts the burden of heavy interest charges for the entire year upon the traffic which can be handled only in the summer months.

†NOTE: A fact often overlooked in considering the cost of transportation as a whole, between producer and consumer, is the cost of assembling freight at the initial point or distributing it at terminal points. In this respect, while the railways have a great advantage, yet even with the railways, the cost of assembling farm products in many of our states (as pointed out in a recent report of the Department of Commerce and Labor) is greater than the freight paid by the farmer from his initial station to the point at which he markets his produce. In other words, a farmer who has to haul his produce eight miles to a railroad station, at a cost of, say twenty cents per ton mile, is spending as much as he would pay the railroad for two hundred and ten miles of transportation at the average rates prevailing over the whole country.

Thus, it is fair to expect that good roads and automobile trucks will contribute much in the future towards cheapening the cost of assembling and distributing freight; and that there is much to be gained by intelligent public expenditures in the direction of improving the public highways and so reducing the cost of haulage to and from shipping points, whether these shipping points be stations of railways or of waterways.

FAILURE OF STATE OWNERSHIP OF RAILWAYS

By A. W. Pearse.

FROM THE PASTORALISTS' REVIEW, MELBOURNE, AUSTRALIA.

One has only to see the condition of the railways of Australia today to recognize that the people have undertaken a contract which they can never satisfactorily carry out. If with a paltry population such as they have now the railways are inadequate, inefficient and unable to carry the country's produce, how can they ever expect to cater for a population of, say, 10 or 20 millions? Instead of one system of railways, Australia should have dozens. Railways and competition everywhere. What a wonderful difference it would make to the whole country; what marvelous strides she would make. The strange thing is that no one yet recognizes the true cause of Australia's stagnation, because, contradict it who will, Australia has been practically stagnant when compared to her two big rivals, Canada and Argentina, for fifteen years. The agricultural and pastoral development has been infinitesimal; the increase of population has been barely noticeable; and, in fact, in the states which first handicapped their producers by high protection they have for years been losing their population. This would all be different were the fetish of state-owned railways killed. "Railways first, and then population" should be the policy of all new countries. This is so in Canada and Argentina, with the result that those countries attract population in large numbers. First of all, a private company obtains a concession to construct a line; a large area of land goes with this; the company cannot take this land away or allow it to remain idle. They immediately run a line through it (with maximum rates fixed by government); they then as fast as possible take out settlers and sell them their freeholds all along the route. They construct feeding lines, make roads, and in every way assist these farmers to become profitable sources of revenue to their line later on. This is as it should be. What does Australia do? She gets a few farmers, mostly sons of existing farmers, gives them leaseholds away off the existing main lines, and many years hence, when sufficient votes in that district can influence an election, they may get a line of railway. Meantime the cost of carriage and the terrible roads prohibit any chance of these farmers making a profit out of grain growing. Is it any wonder, then, that the Commonwealth Year Book shows year after year about the same or even less land under cultivation? Another aspect is that unless young men join the government service there is no opening in Australia for civil engineers. Instead of a few men being employed on railway construction here and there, hundreds of thousands should be employed. Instead of young Australians leaving as they do for all parts of the world to obtain employment, highly skilled men would be required locally. What wonderful life would at once be introduced into this rich country. Shipping would be vastly increased; the harbors, instead of being empty half the year, would be continually occupied; the coal mines would increase their output enormously; mines would be opened up; land would be put under cultivation; and population would pour in. The most vigorous life would take the place of stagnation. The present residents will not agree that there is stagnation, because they see a few new buildings go up in the cities and hear of a few railway contracts being let; they think they are in the flood of progress. But to the man who goes from country to country, and who has in his travels been through fifty-three different countries, such as the writer has, he can see and is in a good position to make comparisons. A visitor is constantly told how profitable our railways are; this may appear so, and is believed to be the case by most people. Suppose, however, a private company wrote down its capital by 30 per cent, and then paid 3½ per cent interest on the written-down capital, would he call that prosperity? This is what Australian governments have done. Large payments have been made, amounting to very many millions, out of general revenue on railway account; these have never been added to railway capital as they should have been, therefore the published capital is not the right capital on which interest should be calculated. Again, if the very worst of service is supplied (and for this service high rates are charged), as in the case of every line excepting that from Adelaide to the Queensland—New South Wales border, can that be called a prosperous service? The position is shown today by the fact that New South Wales and Queensland must spend many millions in duplicating the existing lines or throw up the sponge and say, "We are not capable of supplying our people with a fit and proper railway service."

RAILWAYS AND POPULATION.

It is an elementary principle that population follows railways, or, as it may be otherwise expressed, railways induce settlement. The experience differs according to the nature of the country through which the railways run, but where ordinary commercial considerations prevail when construction is undertaken, the rule is amply vindicated. Traffic must go to the railways, proximity to trunks of communication is a great attraction to settlers, and as a matter of convenience centers are formed. The exercise of sound judgment, unbiased by political temptations, is demanded when new lines and extensions are proposed. To construct branches and then to close them up again, as was done in the state of Victoria during the boom time, is a piece of financial profligacy. But political considerations in Australia have been paramount, and have still to be encountered, although in a milder degree than formerly. A consequence is that the public have been less well served than in countries like the United Kingdom, the United States, Canada and Argentina, where railway construction has been left, as it ought to be, to private enterprise. In the newer countries awaiting and craving for an influx of population the private companies have almost invariably fixed on the routes best calculated to meet the requirements of settlers. Consequences are that not only are the public in those countries often better served at lower traffic charges, but new railway facilities are more promptly provided. Hence the important principle that population follows railways has its corollary in another principle, viz., that the routes best calculated to bring out latent resources should be chosen. A striking illustration of both principles is furnished by some remarks made recently at Temora by Mr. L. R. Robinson, of South and Central Africa, who has recently visited America. In the matter of settlement, America, he said, is far in advance of Australia. In March, 1907, a certain district had a population of less than forty persons on an area of 300 square miles, and there was no water. Two years later it had a population of 4,000 on the soil, and a town containing 2,000 people. Mr. Robinson asked for an explanation. A light railway had been built, and a lake for irrigation purposes had been excavated. This year the railway carried over 3,000,000 bushels of wheat besides other produce. Mr. Robinson was justified in summing up the policy of land settlement as follows:—"Build railways, and population will follow as the hounds do the fox.'' He proceeded to set up a contrast with the great Riverina country, where with vast stretches of richer soil than America possesses, there has been no advance in settlement for twenty-five years. Asking for an explanation, he received the laconic reply, ''No railways.'' The reply was incomplete, for it might easily have been this: ''No railways; private enterprise in railway construction debarred; influx of population viewed with disfavor.''

RAILWAY INEFFICIENCY.

A notable utterance has been made recently to the Farmers' and Settlers' Association of New South Wales by the Railway Commissioner of that State. Mr. Johnson admits, plainly and frankly, that the railways of his state are not equal to the demands made upon them. Were a similar frank statement made by other Australian Railway Commissioners regarding the lines under their control, it would probably be to much the same effect. It is with melancholy satisfaction we record the fact stated, for Mr. Johnson now publicly indorses the view ''The Pastoralists' Review'' has put forward for years past that the railways of Australia, as constructed and conducted under state control, are not efficient, and do not compare with those of countries of similar size and population, such as Canada and Argentina, run by private enterprise.

In effect, Mr. Johnson states that, notwithstanding recent expenditure upon rolling stock, with a view to bringing it up to the requirements of the state, the railways will not be capable of meeting the demands upon them during the coming season, should it prove to be, as hoped, a good one. This is not due, it now appears, as had been generally thought, to the want of rolling stock, but because the lines as at present constructed are not capable of carrying that rolling stock to its full capacity. In his annual report for the twelve months ended June 30th, he writes: ''The rolling stock generally cannot be worked with economy until many of the busy sections of the trunk lines have been duplicated. The work is of pressing importance, in view of the prospects for the coming season, when the difficulty of working extra trains of loaded and empty wagons over long lengths of single line will be most severely felt.'' The New South Wales railways may be regarded in the ordinary way as representing the best of the railways of Australia, or at any rate the average. And now we learn, on the unimpeachable authority of the expert governing these lines, that they fail to carry out the purpose for which they were primarily conceived.

To say that the railways are inadequate does not mean a reflection upon Mr. Johnson or his work. Rather the reverse. He, with his experience, gained on the privately owned lines of the old world, and in the stress of competition, has been able to see the vital defects of our system, and has had the courage to state them publicly. He deserves our thanks. But while he has opened our eyes to our defects in one direction, he has laid bare the vital fact that our system of state owned and constructed lines is a failure. It has cost the commonwealth an immense sum—how much will never be known, because it has been hidden in public works expenditure—and yet it has failed. Compare this result with the splendid railway system of Canada, which has been provided by private enterprise, and how do the results compare? Canada has one of the finest railway systems, while the Dominion has not the responsibility of a huge debt. Australia has one of the worst systems, with the incubus of a vast debt, even though this may be represented by the asset of existing lines.

A comparison with the conditions of Argentina is equally disparaging to Australia. During the year 1908 about 1,300 miles of new lines were opened for traffic, making a total of 14,856 miles open, while at the same time 3,900 miles of new lines were under construction and 6,000 miles under survey. In Australia at the end of 1908 there were open for traffic 14,658½ miles of government lines, 915 miles of private railways open for public traffic, and 638 miles of private railways for special purposes, making a total of all lines of 16,212 miles of line. The mileage of lines under construction at the end of 1908 was 685½, while the mileage authorized was 906¾. The railways of Argentina are essentially for goods traffic, and the opening up of new territory, and there are not the large and profitable systems of urban and suburban passenger traffic, such as exist in all the metropolitan cities of Australia. In the carriage of freight the Argentine railways quite transcend those of Australia, the total carried representing 31½ millions of tons, as compared with 21 millions of tons in Australia (coal included), the former total being an increase of 3,600,000 tons on the total of 1907. The total revenue from the Argentine lines was £20,000,000, against £14,303,000 in Australia, and the working expenses £12,460,000, as against £8,397,000, the Argentine profit thus being £7,540,000, as against a gross profit in Australia of £5,905,000. The interest earned in the case of Argentina was consequently 4.50 per cent, while that in Australia is given as 4.22 per cent. On the surface, therefore, it might appear that the results in Australia were not far behind those of Argentina, but unfortunately the statistics for Australia are very fallacious in one respect, *in that the supposed cost of construction of 140 millions does not include the accumulated deficits which in the many lean years were persistently provided, of necessity, out of revenue by the states, from taxation and otherwise, and should have been added to the original cost of construction.* What this total of past deficits has been will probably never be worked out, but it represents many millions of money, and would, if added to the capital account produce very different results in the matter of percentages of profits, etc. But apart from this fact, the position in Argentina is the same as in Canada—that the republic has a splendid live system of railways, which is bounding ahead, both in mileage, freightage and revenue, and without burden to the state, while its railway companies (under state direction) provide all that the public require, and are a means of bringing to and settling in the country immigrants of a fine class.

Unfortunately, however, the system of State railways in Australia has come to stay, and we must make the best of it as it is. The system has failed, comparatively, as shown by Mr. Johnson, and we have now the problem before us, how to remedy the deficiency. Apparently the first step, and one which railway managers under a system of private ownership would have foreseen and provided against, must be the duplication of all main lines, and especially trunk lines carrying large quantities of produce to the coast. In New South Wales this particularly applies to the western, northern, and southern lines in that order. It seems incredible that year after year the state should have gone on adding new feeding lines, piling up the means of making the old lines pay, and yet neglecting to make those lines capable of carrying the extra traffic. An immediate and complete system of duplication of all great main lines, no matter what the cost, must be undertaken. This is expected to be, at the very least, in New South Wales alone, 2½ millions, even to put the lines in partial order. But whatever the cost it must be met, and that speedily. It is unthinkable that the production of the interior of the continent is to be stunted and blocked because the railways cannot carry it, on account of a vital defect. That defect must be overcome at all hazards, and at once.

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THE CANADIAN SYSTEM.

In the two preceding issues of *The Pastoralists' Review* there have been published articles showing how the Australian system of railways, under government, has more or less failed to provide the settlers with an adequate means of getting their produce to market, and advocating the introduction of a dual form of railways under state and private control. Canada affords Australia a splendid object lesson as to how its great natural resources and its population can be developed. Here, where analogous conditions prevail, the state and the individual work harmoniously together in the public interest, and it is our purpose in this article to give some particulars regarding the Canadian railways. In every way these afford us an object lesson, and if the Australian public can be brought to think outside of state control purely, the Canadian system teaches us how to do more than scratch the surface of this great continent, which is at present ready to bound ahead if it is but given a chance by the aid of an efficient railway system, with effective immigration.

As recently pointed out in the *Sydney Daily Telegraph* by its editor, just returned from the Imperial Press Conference, the Canadian railways "occupy perhaps the first place in the public mind." There is not there a great seaboard, with large intercoastal marine traffic, and the whole development of the interior practically depends upon the railways. In Australia our railways are a comparatively minor consideration. There are no great trunk systems, no federal lines, but our railways are purely local, being owned by the states within which they run, and each state is doing its best to prevent its railways from feeding its neighbor's lines. In this way the opportunities of the producer to reach a market are limited to the seaports of his own state, mostly the capital cities, and he has frequently to carry his produce perhaps hundreds of miles further, and probably at 50 per cent. higher cost for freight than if there were numerous private lines competing for his business. The basic difference between the privately-owned lines of Canada and the state-owned lines of Australia is that the former precede and induce settlement, while the latter follow settlement.

In a measure Canada has but recently become alive to the advantages of the former system, for the railways of the Eastern states were originally worked on our conservative principles. The *Dominion of Canada,* an official handbook, issued in 1905, writes: "Taking population and railway mileage, the western portions of the Dominion have a larger railway mileage in proportion to population than the older provinces. Thus British Columbia, the four territories, and Manitoba, have 12 per cent. of the population, and 30 per cent. of the whole railway mileage, while Ontario, Quebec, and the Maritime provinces, with 88 per cent. of the population, have a little under 70 per cent. of the railway mileage. The reason for this difference is that the railways in the newer portion of the Dominion have been built up as a means of transporting settlers and opening up the country, while in the older and better-settled provinces railways have followed settlement instead of preceding population." No better example of this action can be given than the newly-formed province of Saskatchewan, one of the north-western territories recently made a province. At the end of 1908, we learn from the latest statistics, the population was 257,763 persons, while the railway mileage at the same date was 2081 miles, divided between three companies. Now compare this with the position in South Australia, which in 1908 had 2082 miles of railways and a population of 407,179; while New South Wales, with a population of 1,591,673, or six times that of Saskatchewan, has 3743 miles of railway—less than twice the mileage of that province. No stronger example of the value of privately-owned lines could be given. The latest map, herewith, giving the railways of the province, shows the fruits of competition between various private lines. Of these all but the main trunk line of the Canadian Pacific railway (running through Moose Jaw, Regina, and Wolseley) have been constructed within a period of ten years, and it is significant of the value of railways as a colonizing influence, that within five years the population of the province increased from 91,279 to 257,763, or nearly trebled. There is no record in Australia, of anything like such a development of rural population, which, without railways constructed in advance, would not be possible.

The railways of Canada have from the outset been mainly constructed by private enterprise, except in one notable case, but the state has adopted the wise policy of assisting the constructing companies by land grants, subsidies, bonuses, grants in aid, loans, or the guaranteeing of debentures. In this way the state has had an enormous railway system developed at infinitely less cost to the public than has been the case in Australia; it has for the most part allowed private companies to bear any possible loss; it has had the advantage of competition between different lines, with consequently low rates; and it has had the assistance as colonizing and immigration agents of great private corporations. Practically the only Canadian government railways at present are the Inter-colonial line, of about 1450 miles, which was constructed to bring in the old colonies of Nova Scotia and New Brunswick to the federation, and 267 miles of line in Prince Edward Island. All the rest of the 22,966 miles of steam lines and the 992 miles of electric railways are operated by private companies, of which altogether there are 164. The cost of the government lines has been $95,273,779 (about £19,000,000), and the capital invested in the privately-owned steam lines is $1,239,761,013 (approximately £250,000,000), and in the privately-owned electric railways $87,903,331 (approximately £17,500,000). So that the total private capital invested is about £270,000,000. The total state aid given was $115,023,861 to steam-owned lines and $3,926,713 to electric lines, or a total of approximately £24,000,000. In addition, the government has made grants of land amounting to 57,000,000 acres, *the bulk of which would, of course, have been valueless without the railways, which thus greatly increased the value of contiguous state land.* The Dominion and state governments and municipalities also made loans to companies of about £6,000,000. This is the price paid in actual cash and land by the Dominion for its railways, which consist of just under 24,000 miles, as compared with 14,658½ miles of government lines in Australia, and which cost £139,998,015. Possibly, as a mere matter of figures the annual cost to the state is much about the same in both countries, but what a difference is there to the state as a whole by the Canadian system? This can be seen by a comparison of the figures regarding railways for the two countries for the year 1908, which were as follows:

	Canada.	Australia.
Passengers on all lines, steam and electric......	333,144,401	159,621,788
Train mileage for passengers..................	88,362,384	18,997,858
Freight carried, in tons........................	63,803,642	21,137,215
Freight train mileage..........................	41,029,234	22,227,713

The difference in these figures is stupendous. They show that, for practically the same annual cost to the state, the Canadian railways carry twice as many passengers as the Australian railways and state tramways, while the freight carried is three times as great, over distances twice as great as those of Australia.

It might, of course, be held, in the absence of figures to the contrary, that the Canadian results have been obtained at the expense of the producers, but, so far from this being the case, the public statistics prove just the contrary. For instance, the Commonwealth statistics show that in 1908 21,137,215 tons of freight were carried for a total payment by consignees of £8,461,377, or an average cost per ton of a fraction under 8s. per ton. In Canada for the same period 63,803,642 tons of freight were carried, at a total cost to consignees of $98,903,077, or an average of just under 6s. per ton, an advantage to Canadians of just about 25 per cent. But the latter also derived the advantage that their goods were carried far greater distances, for 25 per cent. less in cost, as the total freight miles run were 41,029,234, as against 22,227,713 miles in Australia. Thus in Canada each ton of freight was carried almost twice as far as in Australia, on the average, at an average cost of 25 per cent. less. This, of course, is the natural result of competition.

Unfortunately, the figures regarding the working of the government lines in Canada are not given separately, but it is significant that whereas the whole of the railways of the Dominion in 1908 earned $160,925,362, and the total working expenses were $116,000,022, leaving a profit of $44,925,340 (approximately £9,000,000), the Canadian government lines earned only $9,248,917, and the operating expenses were $9,757,533, thus showing an actual loss of $508,516 (approximately £100,000). *In fact, the Canadian government do not set out to be railway managers. They know it is not their business.* They built their two existing lines for purely political purposes, and apparently do not expect them to pay profits. But what is more significant still is that, having in view the necessity for building a second great transcontinental line, north of the Canadian Pacific line, to open up a vast northern area for settlement, now almost unoccupied, the government decided to construct a line from Moncton, in New Brunswick, to Winnipeg. The government, however, does not propose to run this line as a business matter, or in competition with existing private lines. On the contrary, it has handed over the line, on lease for fifty years, to the Grand Trunk Railway Company, which will manage the line, and continue its construction through from Winnipeg to Port Simpson, on the Pacific Coast. In the latter case the state undertakes to guarantee a fixed interest on the company's debentures, for a given number of years, and thus assures the ultimate success of the line, even if it fails for a term. In no stronger manner could the Dominion have expressed itself in favor of privately-owned railways as compared with state-owned lines. The deduction from the various facts placed before our readers must thus be that the Canadian system of combined state and privately-owned lines is infinitely superior in its results from every point of view to the Australian system of purely government lines, and should these facts become more generally known the tendency must be towards the erection of future lines by private individuals.

STATE RAILWAY A FAILURE IN FRANCE

By William Philip Simms,

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Paris, October 8, 1910.—Of course it does not necessarily follow that nationalization of public utilities is not a good thing because it fails to give very satisfactory results in France. For that matter public utilities in private hands are very generally mismanaged all over the Gallic republic. French genius doesn't seem to run to the successful operation of such enterprises. But it is only after they have been nationalized that they reach their very worst. And when they do reach their worst it certainly does appear as if they had gone the limit.

There is certainly no telephone system in the world that is so bad as the one in Paris. The state tobacco monopoly is a swindle from the very people who support it. So is the match monopoly. The telegraphs are lower and more unreliable than in any other country in Europe. The postoffice is not overly efficient. The railroads are shockingly handled. Everything, in short, that the government touches, somehow contrives to go to the bad.

But in the conduct of the recently nationalized Western Railway of France, the state has been really outdoing itself in the course of the past few months. It is about eighteen months since the government, after a long debate in the chamber, resulting in a small majority for the administration, bought the line.

Well, since July 18th, of this year, there have been seventy-one deaths by accident upon that one road—which is not a long road at that. A still larger number of passengers sustained more or less serious injuries.

The Western Railway of France has to a certain extent a monopoly. The country through which it passes is very little touched by other systems, so that many of the people who patronize it must use the Western or none.

For one thing, the road is the principal connection with the Paris suburbs. The other evening, when the train was made up for Poissy, the 40 first-class passengers who had to travel on it found that there was only one first-class coach with three compartments, affording accommodations for 18 people.

Of these three compartments one was reserved for women. It so happened that no women were traveling by the train, so the women's compartment was empty. Some men got into it. They were turned out. Then the forty passengers appealed to the guard, who treated them with rudeness. Then they marched in a body to the station master's office. A secretary received them, with the assurance that they "must be mistaken." Finally they almost literally dragged him to the platform. By that time the train had left.

This is one of the hundreds of complaints which are being made constantly against the management of the line. Baggage is lost, not now and then, but every day. If it gets through, it invariably arrives several hours later than its owners.

On Sundays and holidays, when the traffic is especially heavy, then the passengers are invariably driven to such danger by the inconvenience and indignities to which they are subjected that it is the regular thing to have special forces of police detailed for duty at the St. Lazare station to prevent rioting and the mobbing of the railroad officials.

The employes are as dissatisfied as the passengers. Their hours are greatly lengthened by the incompetence of the administration of the line and they are consequently constantly surly and quarrelsome.

Since the accident at Bernay, September 10th, in which seven persons were killed and forty hurt, a number of engineers have stated that they repeatedly warned their superiors of the dangerous condition of the track just outside the town and that no notice whatever was taken of what they said. The management has replied by a note to the Paris newspapers to the effect that "no written and signed complaints of the state of the line were received." Commenting upon this explanation, several of the engineers have pointed out that, arriving at the end of their runs an hour or so behind schedule time, they felt that they had done their duty by making mere verbal statements.

Red tape as much as anything else is responsible for the difficulty. If you lose a valise on the Western State Railway it takes two months to get an answer to your claim and years before the claim is heard in the courts. The French public understands this so well that very few claims are pushed, the people preferring, as in other cases of the state mismanaged telephone service and the match and tobacco monopolies, to grin and bear their losses rather than lose more time than they can afford by making claims and pushing them.

The train crews' incivility is almost unbelievable. If the complaints are made of late trains, lack of accommodation, unlighted cars, or the loss of baggage, the complainants are asked three times out of four why they travel at all. There is no use in reporting such cases to the superior authorities. The men all have votes and form so powerful a lot of electors that the ministry of the public works is absolutely afraid of them.

At a station a few miles out of Paris a few days ago, a train bound into the city pulled up with the first class coaches filled to overflowing with third class passengers. Three holders of first class tickets, awaiting the train, protested to the stationmaster. "Get into the guard's van," said the stationmaster. But the passengers insisted upon exhibiting their first class transportation. "Oh, well," said the stationmaster, "if you are rich enough to travel first-class, you're rich enough to take a taxi to Paris."

As a matter of fact, in their desperation over conditions a number of rich men living in the Paris suburbs are actually trying to get a bill through parliament authorizing them to run street railways from the city some thirty or forty miles out, paralleling the Western's line.

The government is not at all favorable to this plan, fearing it would cut in upon the railroad's revenues. The supporters of the scheme are very influential, however, and they may succeed in carrying their point. If they do, it will probably not be long before the street railway line will be nationalized or municipalized too, and then it will be as bad as the Western itself.

A FRENCH VIEW OF THE SITUATION

From *Le Journal des Debats,* October 10, 1910, as Translated for the *London Railway News.*

The serious and too numerous accidents, which have taken place lately on the old system of state railways and on the system recently taken over by the government from the Western Company, have stirred up public opinion and somewhat shaken the faith of those who most ardently supported its acquisition. Even such as are uninterested are beginning to open their eyes and to think that the working by the state—of which such great things were promised when the government wished to take over the Western system—is, in effect, far from being as good as that under private ownership. The Minister of Public Works clung to the hope that he would be able to set aside that state of feeling which the Press, of all parties, had so frequently pointed out. In his recently-delivered speeches, while going over the state system, the Minister of Public Works vigorously defended the costly and regrettable action of taking over the Western Railway. For this purpose he thought he ought to take as examples several foreign undertakings, stating that the lines taken over by the different states were successfully worked, and that, on the whole, the nationalization of railways, so far as it has been carried out, showed good results. But, these examples showed the contrary, and this argument, very dangerous in the circumstances, is opposed, as we shall see, to the thesis of the Minister of Public Works.

It pleases us all the more to point this out as, when the late accidents occurred so disastrously, one after the other on the state systems, we remained impartial—an impartiality of which those supporting the acquisition of the line by the state gave but little indication in their disputes with the private companies. We have even abstained until now from criticising the working of the system taken over by the state, because we considered it only fair to give those who claimed that, all other things being equal, they could work the line more successfully than the former administration, the necessary time to fulfill their promises, which we think, after all, were somewhat rash.

But, with regard to the good results obtained abroad by state-owned lines, it is necessary to put the matter in its true light. Take Austria, for instance, whose last year's working of its railways showed a deficit. The report of the Budget Commission shows that, for the year 1910, this deficit amounted to 90 million francs. There results then an increase in coefficient working. The Chairman of the Railway Budget states that the rise has been from 75 per cent in 1907 to 87 per cent in 1909. As against this financial juggling, it is stated that general and very lively complaints have been made by commercial and industrial centers. Industrial and commercial people complain of the inadequacy of the plant, rolling stock and general installation of the systems, and these complaints are not idle recriminations, inspired by party feeling, for the administration of the state railways is itself unable to refute them. As the consequences of the taken over of railways by states is spoken of, we must here point out what the consequences are which have been experienced in Austria, other than the results we have already mentioned. Goods tariffs have been raised again since the 1st of January, 1910, in the hope of obtaining an increase in returns which was estimated at 40 millions. At the same time also, passenger rates were raised; this rise was, in the case of third-class passengers, about 27 per cent. That is not exactly democratic.

Hungary has not been any more successful with its state-owned lines. The Minister stated in his last report that, from 1902 to 1908, the expenditure has increased 70 per cent. The net proceeds had fallen very considerably since 1906, when they stood at 105 million francs, to 1908, when they reached exactly 70 millions. The embarrassment of the Minister of Finance, who already has to pay, in respect of the railway loan, 115 millions a year, is very clear. Naturally, the general budget revenue is drawn on in order to cover the deficit, and **it is the taxpayer who pays it, for it is made up by the taxes.** There is an endeavor here, therefore, as in Austria, to increase the receipts, and for this purpose the tariffs on goods were raised as from the 1st of January last, in proportions varying from 5 to 30 per cent. And so, it is not only the taxpayer who pays, but the burden also falls on commerce and industry.

Let us continue our journey and go on to Prussia. It is there that we find the most approved working of state railways. Moreover, there the lines are worked fiscally, and they form one of the chief sources of revenue.. However, the good returns are not upheld to the same extent. The last financial years have shown very considerable decreases in value as compared with the budget estimates, and the Minister of Finance is rendered uneasy thereby. But, then, the tax on passenger tickets, the institution of which we announced in these pages in 1906, has not yet yielded sufficient returns. Although the public is dissatisfied, the tax will not be taken off as yet, for the working expenses increase there, as in other places, in a very considerable degree. The coefficient working, which in 1900 did not exceed 59 per cent, reached 67 per cent in 1907. (It was 69.99 in 1909.)

Again, has Belgium, on her side, any cause to rejoice over having assumed control of her railways? Our readers know they have not; every year we give them all the information on this point with which the budget reports furnish us. Here the financial results are not good, and it is particularly difficult to estimate the deficit, which has been accumulating since the state first took over the line, on account of the want of clearness in the bookkeeping of this department, and in which the fall in prices has on several occasions been modified. The deficit, since the acquisition of the lines by the state, has reached over 86 millions. This industrial country is suffering, as well, from inadequacy of installation, and frequent expressions of discontent are made by the people who are served by the line.

Going further south, on our way to Italy, we come to Switzerland. Here, again, our readers are kept supplied with information as to the returns since the Federal government again took over the lines. From 1903 to 1908 the balance of the profit and loss account has only once shown a surplus; that was in 1906. All the other years the working showed a deficit, and this deficit amounted to nearly six million francs in 1908. This situation is receiving the attention of the Federal council, which does not hesitate to admit that the financial crisis of the Federal Railways may have a bad effect on Swiss credit.

When we come to Italy, we find the worst conditions imaginable. The last deficit amounted to something like 75 million francs. Since the state has taken over the working of the lines more than 1,000 million francs has had to be borrowed for the improvement of the system and for the salaries of the staff, which, as we know, is very exacting and very turbulent.

If we now leave Europe and ask Japan what state-ownership has done for her, this is what her ministers would say: The total payments for the taking over have exceeded by more than 156 million francs the estimates for the scheme; the improved conditions which were promised at the time of taking over have been deferred until later, because the coefficiency of the working is always increasing; the issues of debentures made to indemnify the companies weigh heavily on the financial market.

Such are, then, roughly, the balance sheets of the state-owned railways. Such examples ought to have opened the eyes of our parliament at the time of taking over the Western. Our experience, if we may judge from its beginning, will only be another case to add to the other countries. It will show that the state, in France as elsewhere, cannot make an industrial success of its railways. The states either work them "socially" and make the ratepayer contribute the deficit, or they work them "fiscally" as in Prussia—which is rare—where they make their railways a source of revenue and could not really consent to improve the tariffs. More often than not, owing to unlucky political action, they work them "socially," with the result that no one is satisfied. The majority in France belong to this category. A first demonstration was made on the old state line; when they wished to try an extension, this will prove a dear school. But all the examples offered by foreign states would not modify the opinion of those who believe these problems to be not political but questions of economy.

THE PEOPLE'S INVESTMENTS IN RAILWAYS

By James Laurence Laughlin, Ph. D.,
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AT THE FOURTH ANNUAL MEETING OF THE ASSOCIATION OF
LIFE INSURANCE PRESIDENTS, AT CHICAGO, ILL.,
SATURDAY, DECEMBER 10, 1910.

I

We have before us one of the gigantic questions of political economy which are ever rising larger and larger with the increasing development of our democracy; a question of political economy, I say advisedly, because it has to do with the economy of the whole state, and touches the vital interests of the millions of thrifty and prudent members of society. It is not at all a question as to the earning of a profit on the capital invested in the insurance business. Here we have no problem of capitalism and the proletariat; there is no clash of interests between employers and workmen; there is no antagonism of class interests. It is simply a study of the organized control and investment of the savings of those in our democracy of 100,000,000 who wish to provide for their families and for days of helplessness and ill-luck. Is it well with this gigantic fund on which our wives and children are to depend? Or, are there dangers to be watched for? It is an economic question which demands serious attention.

It deserves the more attention because of the surprising magnitude of the interests involved. We have very recently heard much of postal savings banks and of the nature and magnitude of these savings. The total current assets of the insurance companies, however, January 1, 1910, are $3,643,857,971, or about the same as the total savings in all the banks of the United States ($3,713,405,709); larger than the savings in all the institutions of Germany, and three and a half times as great as those of the United Kingdom. The total life insurance of the United States in force this year is larger than the accumulated savings in the institutions of the whole world ($13,425,066,823).

On January 1, 1910, there were no less than 28,087,327 policies (including industrial insurance); and the insurance companies of the United States had pledged themselves to provide for beneficiaries sooner or later an aggregate sum of $15,480,721,211—a sum five times as great as the public debt of this country at its highest point at the close of the Civil War, and fifteen times the present debt. Within ten years (1900-1909) the amount of life insurance contracted to be paid has increased by $6,031,601,217 (excluding industrial companies), or six times the total of our national debt. The total current assets carried, January 1, 1910, were $3,643,857,971. This sum is the ship which is carrying the hopes of millions of our people. Is that ship seaworthy? That is the question the people are asking—and which they have a right to ask. And an economist may well give thought to so grave a question. In what form are those assets carried, and what are the conditions affecting their safety now and in the future in this democracy?

These assets, of course, were placed in the productive investments of the country, and were grouped roughly as follows (35 companies doing business in New York):

30 per cent.	Real estate mortgages	$1,084,345,817
12 per cent.	Premium notes and policy loans	446,276,468
48 per cent.	Bonds and stocks of all kinds	1,761,404,870

It thus appears that the largest item is that of bonds and stocks. This entry is resolvable into the following, as nearly as can be estimated:

Railway bonds (35 companies)	$1,225,576,728
Corporation securities	250,000,000
State, county and municipal securities	286,000,000

This analysis of the kind of investments in which the people's insurance savings are placed may thus enable us to discuss the fundamental issues in the situation as we find it today.

II

The situation today in our democracy is a curious complex of ignorance, progress, radicalism, intelligence, idealism, and conservatism. Just as with the greenback and silver manias, so with banking, railways, and corporations, we must face the fact that problems which should—and would in a country like Germany—be sent to experts for solution, must here be settled by a counting of noses in an electorate, which means well, but which is wholly untrained in abstruse subjects of vital importance. Yet the man in the street is likely to insist on being allowed to express his opinion as if he were an expert. The rigidity and cocksureness of the narrow mind is a part of the situation. The great mass of men mean to do the right thing, according to their lights; but the "lights" are practically the whole of the difficulty. Everything depends upon getting the truth before a suspicious and distrustful community. By distortion, a hostile mind can with ease change black into white, and preoccupy the mind with some error for a generation. Sometimes the outlook seems hopeless, and with Rabelais we think that "only if the skies fall, may one hope to catch larks."

More than that, we are in the midst of an economic and mental transition which seems to be little understood. We cannot see the forest for the trees. Never in economic history have there been going on more, or more perplexing, changes in industrial organization than in the last few decades. Indeed the modification of our economic structure has been going on faster than our recognition of it, and faster than our ability to analyze and explain it. Education has not kept up with progress. We are still applying obsolete habits of thinking to things which have dropped the old ways of life. We are still estimating complex organizations by standards suited to the simplest order of industry.

In addition, our free atmosphere is sure to produce a vigorous growth of radicalism. That is as sure to come in a democracy as weeds in a rich soil. Radicalism is, however, a generous quality, more akin to good than to evil. The danger from it lurks most in the egotistic, truculent, ambitious political leader who uses the generous impulses of radicalism for his own uses. We all know the man among us. "Who peppered the highest was sure to please." Indeed, it is almost pathetic to see how the great mass of men eagerly long to believe in some leader who offers them sincerity, courage, and sympathy for their rights. We are a mercurial people, who often move under waves of emotion without much discrimination. Yet on very difficult public questions which require non-partisan experts, a self-confident, restless politician will not hesitate to break in and appeal to the mob-spirit without regard to future consequences of great moment. "A cow," says Dr. Johnson, "is a very good animal in the field; but we turn her out of a garden."

There are many other constituents in the complex in which we must settle our public questions. The possession of property, and the actual conduct of a business great or small works more for economic conservatism, and has more influence in our electoral campaigns than all the teaching of history, or the church, or the workings of a reasoning mind. The business community in the United States, in village or in city, is as much distrustful of change, of the necessity of readjusting themselves to new conditions of trade, taxation and methods of production, as the privileged classes of old. And yet this conservatism is being constantly shot through by the progress of invention and industrial change until it is a patch-quilt of conflicting forces. And, on top of all, is to be found a growing intelligence, a quickened conscience, an unmistakably soaring idealism, which more and more can be called upon to respond to every call of fairness and justice.

In a situation such as this—complex, often discouraging, often surprisingly hopeful—we are obliged to study the present and future of the people's investments. They are at the mercy of our democratic ways. Through blunders and misconceptions, perhaps we may move, as we have in the past, to a sane policy—especially since that policy now concerns the interests of those who have tried to protect the material welfare of their families in the future.

III

The people's investments are, therefore, as disclosed by the facts shown above, bound up with the success of our railways and corporations. The ax that is laid at the root of these widely-extended industries shakes the limbs of the funds stored up for future emergencies. They are no safer than the productive industries of the country, from which all income is derived. Perhaps it may not be amiss, during the din raised by the shipper and the consumer in the railway and the corporation fights, to hold a brief for the people who have been prudent and frugal enough to lay by an honest penny for the future.

Right at the start we must face the fact that the insurance solicitor is the enemy of socialism. The socialist emphasizes the labor element in all production, and regards the payment of interest on capital as exploitation. Consequently, the assumption by the state of the control of all the capital in the country would mean the disappearance of interest as a means of income, and the entire abolition of the investments by which old age and misfortune are provided for. The attack on capital is an attack on self-control, thrift, and foresight—the virtues most essential to a sound community life. The safe investment of savings in securities for future use carries with it the decision in favor of an organization of society which will allow industrial freedom, equal rights, and a fair field to all the necessary factors of production—whether labor, or capital, or managerial capacity.

Nevertheless, we must admit the fact that few people are able to make an economic analysis of any industrial situation; the beliefs of most are founded on authority or established by repetition of phrases. That which is heard often becomes belief. Hence, it is a duty of the leader of any industry to learn what it is that lies in the mind of the people, to study its peculiarities, to educate it, and then try to adjust practical action to the world as it exists. In view, therefore, of the complex conditions of industry in a democracy, and the need of a comprehending insight into the forces at work, it might not be much out of the way to say that, besides executive ability, the president of a great company should be an economist and a psychologist.

First, then, it may be well to examine the case of railway securities, which form so large a part of the people's investments. The ability of the railways to pay a legitimate dividend on capital is as essential to the maintenance of transportation of persons and goods —one of the most necessary services required by society—as is the payment of wages to their employes. At the bottom of a just policy toward railways is the right to the same treatment that is accorded to other industries, such as agriculture, mining, or manufacturing—except so far as it is necessary to take into account their quasi-public character. As quasi-public corporations, railways must submit to that kind of supervision by the public which will ensure equality of service and the same rates to all. But beyond that, the railway should not be singled out for crippling and special attacks any more than an iron furnace or a shoe factory. Yet because of the psychological conditions above described, the ambitious politician wins votes by "baiting" the railways and large industrial organizations. Therefore, it is well, as in the recent election, to drive the cows out of the garden. The need in Congress is for men who are not the representatives of special interests, but who will take into their purview the interests of all who are affected by the problem.

In the case of railways it is impossible to claim that rates are too high as a whole; they are less than in other countries where wages are lower; they have stimulated the traffic to move in quantities unknown in any country in the world. As in no other land, have railways carried the freight so low as to have made waterways (with cost of roadbed thrown in) unprofitable. These are generally known facts. Yet, on the other hand, why are the public so stirred up on the railway question? For two main reasons: (1) Because of real, or supposed, inequality of treatment in the past, by discriminations not only between persons, but between competitive cities and districts. A real service has already been rendered in making discriminations practically impossible. But even in trying sincerely to treat all alike, it is not easy to say what equality of treatment is. In the main, the railway excitement of today is a shippers' excitement. It is a struggle of one interest against another. Suppose the shippers should prevent an increase of railway charges, will these shippers guarantee that the prices of their own goods to the consumer will not be raised? These men in trade are charging all their "traffic will bear." If they must pay high wages, or more for materials, building and equipment, the state does not prevent them from raising the prices of their products to the consumer. Why should it be forbidden to men in the railway industry? There is no legitimate reason, in the main, but that it is popular to "bait" large industrial organizations. Yet, let us be fair. In the past, absence of conscience, greed for gain, and love of financial power, have led to acts which have made even decent railway management distrusted. The decent are now suffering for the acts of the wrongdoers.

As a second reason (2), many are unable to understand the basis on which railway rates are constructed. To the socialist, and to the mind acquainted with simple methods of production, expenses of production are mainly labor costs. In competitive conditions—which most regard as ideal—prices must reflect largely labor outlay. These states of mind explain why so many people believe that any other theory of rates than the "cost of service" is unjust. They do not comprehend that there is a large fixed charge to be met whether much or little traffic is carried; and supplementary costs for taking on new traffic are to them riddles. Indeed, state railway commissions—in lieu of a better basis—are actually trying to enforce a cost of service theory of rates. And yet they could not possibly say how much of the joint expense of the railway should be assigned to passenger as against freight traffic, nor how much to shoes as against cotton cloth. Indeed, classification contains in itself a theory of rates.

As a consequence, we find the treatment of railway rates, difficult in itself, rendered more difficult by the psychological conditions of the public mind. Are the shippers to be allowed the chief consideration? Why not hear also those districts that need railway transportation, those that need more and swifter service on present lines, and for which new capital is imperatively needed? Why not hear also the 28,000,000 policyholders whose life insurance is dependent largely on the stability of railway earnings? Obviously, railway matters should be taken out of politics, and if politicians begin to use them for selfish ends, then—as in the last election—let us get rid of the politicians. It is high time that the investor, as well as the shipper, had his innings. Looked at from the point of view of social service, food is as necessary as transportation. If expenses of production in agriculture go up, why should not the products of the farm go up in price? But if we deny to railways the right to raise rates when expenses increase, then we should legislate against the high prices of farm products. Why not regulate the prices of food as well as of transportation? If it be answered that the latter is under monopoly, then the same may be said of farm lands. But the public mind, which insists on competitive rates where cost concepts are impossible, demands a system of rates for a complicated situation which is only applicable to a primitive stage of industry. As investors, we have a right to demand equal treatment and the right to earnings on our savings. If we do not now get it, then we will throw our votes to the policy which will give it to us. Since government supervision of railways has been granted, we demand that it shall protect the investor through reasonable earnings as well as the shipper through reasonable rates. The two cannot be disassociated. And the supervising body must be one capable of understanding the real nature of railway organization, the impossibility of competitive conditions (or cost of service), and the necessity of not frightening away capital when needed for a legitimate improvement of the country's system of transportation. To policyholders it is not a light matter that of the $9,118,101,813 bonds issued by steam railways in the United States, 35 companies own $1,225,576,728 of them.

The ability to make earnings and pay dividends is a function of several variables. Higher wages may not go with greater efficiency; if not, and if more is paid for the same service, then net profits are directly lowered by the increase of wages. Higher wages may possibly bring more efficient service, greater accuracy, a better quality of man, greater freedom from accident and damage, and thus more than recoup the company for the increased outlay. The outcome hinges upon whether this efficiency can be brought out by the act of the employer, or not. Generally, when increased wages are given, the increased efficiency depends upon the will of the receivers of wages. If we had an ideal laboring force, greater efficiency would usually go with higher wages, or shorter hours. As a matter of fact, the managers of labor unions seem to hold that strict discipline by the company, and discharge on account of neglect of duty, is contrary to the rights of workmen. Under the conduct of most unions—not all—increased efficiency will not be the consequence of higher wages. If such are the facts, then the railways should be allowed to increase the price of traffic to compensate for the increased expenses of operation. If general social causes have increased the cost of living for workmen, then they may legitimately ask for higher money wages, and society could have no excuse for refusing the companies as compensation a higher rate for transportation.

If it be put that the increased cost due to higher wages could be compensated for by devising other forms of efficiency and economy, that plan would require the skilled management (by which the savings were devised) to forego the returns assignable to itself, and make a gift of those sums either to workmen who received the higher wages (without increased efficiency) or to the shippers in the rate of traffic. On what grounds of justice could this be asked? Obviously, only on the theory that the skill of one agent in production (managerial capacity) should make up for the increased demands of a different agent.

Moreover, railways differ in conditions and ability to haul at a low cost. Those roads which have earned a surplus, turned it into the property, reduced grades, and lowered the cost of carrying a ton a mile, could now stand fairly well—at least for a time—the increased expense of higher wages, and continue present dividends. But it would not be true of all roads. Some are not earning any dividends; some are earning only fixed charges. If wages are increased on one road, they must be on all. A horizontal increase of expenses, therefore, would affect roads unequally, injuring the poorly conditioned roads the most. In that case, higher rates must be allowed to prevent bankruptcy; and higher rates must be allowed to all roads. A long-headed management cannot be punished for its prudence, and refused what is allowed to an inferior. Therefore, if no increase of rates is granted, we may look for an increase of defaulting roads among the weaker roads of the country. The best roads will undoubtedly hold their own, possibly with retrenchment, and reduction of service to the community.

V.

The stability of our corporation securities (stocks and bonds of water, gas, telephone, ferry and dock, electric light and street railroad companies, banks and trust companies) are affected by much the same psychological conditions as those of railways. The corporation has come to stay, and has a right to live; although that does not mean that unprincipled men should find refuge for dishonorable business methods behind corporation law. But large industrial organizations only reflect the progress of the age; they are too numerous and too important to be made the target of political attacks; and business in general must wait in suspense until a plain and direct way is open for the legitimate operations of large organizations. No one objects to reasonable and non-political supervision by the government; but all must object to legislation which no one can understand, and which cannot possibly be enforced.

VI.

The responsibility of the companies for the vast accumulations of a people's savings cannot be too seriously stated. In the very nature of things, these great sums must be invested by those who are most familiar with the important industries of the country, and especially with those of the greater magnitude. There must inevitably be constant business dealings between these companies and those in control of the great banking, industrial and railway corporations. Under our present psychological conditions, it is easy to buy cheap popularity by raising the cry of "Wall Street." It makes no difference whether it is X Street or Y Street; there must be a market for securities. There are tricks and dishonesty whereever imperfect men gather; but the men in charge of our companies can be, like President Cleveland, above all suspicion, and must get securities from the markets where they are bought and sold. Individual officers and directors may sporadically go wrong; but the whole body must be sound to the core, or the very fabric of our business organization must go to pieces. If men did not keep their word, business would not go on twenty-four hours. As investors, we are banking on the integrity and good judgment of the men in charge of these companies. They are not likely to fail us. Without doubt life insurance is safer than it ever has been. Now it remains to be seen if the people will, by its treatment of railways and corporations, consciously undermine its own investments.

RAILWAY ACCOUNTS AND STATISTICS IN THE UNITED STATES

By A. J. County,
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AT THE EIGHTH SESSION OF THE INTERNATIONAL RAILWAY CONGRESS, BERNE, SWITZERLAND.

The great development of the United States and the continued prosperity and progress of that country is more largely due to, and more dependent upon, its railways than any other single factor. The expanse of territory occupying 3,000 miles from the Atlantic ocean to the Pacific ocean and 2,000 miles from the Great Lakes to the Gulf of Mexico, containing unrivaled agricultural and mineral wealth, was touched only in a few places, and to a limited extent, by the ocean, inland water and canal transportation routes and but sparsely inhabited before the advent of the railway. The railways were therefore welcomed as the true pioneers and the country devoted its energies to their construction as the quickest, most direct and economical method of bridging the great distances and overcoming the adverse physical and climatic obstacles within its borders.

Prior to 1870 grants of lands, or money and franchises were made, without any important limitations, by the National government to encourage transcontinental lines across the western territories, and by various states and municipalities, with the object of attracting population to their borders and securing the great commercial rewards and trade routes. The railways quickly spread throughout the country, preceding, instead of, as in other new countries, following the settler, and, while the varying tides of prosperity and depression have left great marks on these commercial arteries on which the country is so dependent, as well as on the fortunes of those who invested their money therein and those who directed their operation, they have evolved well rounded and prosperous railway systems and serve a population of between 90,000,000 and 100,000,000 people.

The growth briefly sketched in decades is as follows:

	Miles.
1830	23
1840	2,800
1850	9,000
1860	30,000
1870	53,000
1880	93,000
1890	164,000
1900	193,345
*1910	239,652

On June 30, 1909, there were 233,000 miles of railway, which in the year ending on that date had operating revenues of $2,494,000,000, operating expenses including taxes of $1,751,000,000, and net operating revenues of $743,000,000.

GOVERNMENTAL REGULATION.

It is not surprising that well-defined accounting and statistical methods should form a prominent feature in the operation and management of these extensive and privately owned systems, and that the National government as well as the state governments should desire to supervise their accounts.

It will be recalled that the United States of America consists of many independent and sovereign states, united by a written constitution, thereby forming the United States, or National government, which, in addition to exercising certain powers in all of the states as granted by the Constitution, directly governs the various territories not yet formed into states. While a few railroad charters have been granted by the National government in the territories from time to time under its control, because state governments did not exist therein, the railroad companies derive their powers and privileges from charters granted by the respective states in which the lines are located and operated, and exercise their powers and privileges subject to the laws of these states. The railways are owned by individual stockholders who provide the capital therefor by the sale of capital stock, bonds and other forms of securities, and are constructed, maintained and operated by directors chosen by the stockholders, and officers and employes appointed by and subject to the directors in accordance with the state laws. Never-

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*Supplied from latest official information.—S. T.

theless, while privately owned and operated, the transportation business and service so generally affects the entire country by serving its necessity and convenience, that it is rightfully regarded in the nature of a public service and interest, and is therefore subject to regulation by the state, and as hereafter explained, by the National government. This public interest is not confined to America, for it will be remembered that a large part of the capital was obtained in other countries and therefore these countries are interested in the welfare of American railways, not only as investors, but also on account of the export of agricultural, mineral and other products.

Under the Constitution the National government is granted the power of regulating commerce with foreign nations and among the several states, so that while all commerce within a state is subject to the authority of that state, all interstate and international commerce is regulated by the National government. Around this plain constitutional provision has grown in the past thirty years a vast body of national legislation and judicial decisions. The railroads were so necessary to the growth of the country that little attempt at regulation was made prior to 1870, but by building into new territory and by merger and consolidation the various lines became so extensive, and the population and business of the entire country which they serve have so well kept pace with their growth, that the desire for more specific regulation by the state and National governments became general. It naturally began in the states, and, as the result of the ''Granger Agitation'' in the western states in the '70s, many state railroad commissions were appointed, with powers to enforce the laws under which the railways existed, and especially to see that railway rates and service should be reasonable, and open without discrimination to all individuals and communities. Many of these railroad commissions, and among them some of the most influential, like that of the state of Massachusetts, organized in 1869, possessed only advisory and recommendatory authority, and relied for their effectiveness largely upon public opinion, but gradually the powers of the commissions have been extended and become mandatory. During the past few years several of them under the title of public service or utility commissions have been given not only mandatory powers as to steam railways, but their authority has been extended to electric railways, telegraph and telephone lines and other transportation agencies and their accounts, so that a uniform system of accounting might be established, and the results published by the state for the information of the authorities, the citizens and security holders. The powers of these commissions extend not only to accounting, but in many cases to approving the issues of stocks and bonds, and other important matters not within the scope of this paper, such as betterment of the transportation service and facilities generally, and the rates to be charged therefor.

UNIFORM ACCOUNTS AND STATISTICS PRESCRIBED.

Railway regulation was not long confined to the state authorities, for in the decade ending 1880, the question was given extended consideration by the National government, but the necessity for national legislation was not apparently ripe, and no decisive action was taken until the passage in 1887 of an act to regulate commerce, known as the Interstate Commerce act. This act marked the first step of the Government to prescribe a uniform accounting system for interstate railways, by a commission called the Interstate Commerce Commission. Many of the railway companies had observed a general classification of operating expenses, and the principles and practice of railway accounts and statistics had been formulated and many of the railway companies published admirable reports for years preceding this act, but it is from the passage of this law, and the subsequent notable expansion in railways and their revenues, expenses and finances, that the public for the first time sees a definite foundation for the present uniform accounting and statistical system. The provisions of the Interstate Commerce act of 1887 regarding accounting, required annual reports covering capital issues and payments; physical characteristics; operating, traffic and financial statistics; information as to rates and fares; and the contracts with other railways, and gave the Interstate Commerce Commission the right in its discretion to prescribe a uniform system of accounts.

Regulation by governmental commission was a new feature in the United States, and it should be recorded to the credit of American railways that instead of antagonizing the legislation regarding uniform accounting, they formed the Association of American Railway Accounting Officers in 1888 with officers representing 72,000 miles of railway and convened in the spring of that year to consider a form of annual report to be made to the National government, and the act of 1887 was made effective by the friendly co-operation of the railways, for its provisions could not be enforced on account of the inadequacy of the money appropriated. This co-operation between the railways and the government still continues, and while naturally the views of the government and railway officers have sometimes differed, a great work has been accomplished which could not have been effected in any other way, *i. e.*, that of evolving a uniform classification of accounts so far as it is possible to obtain one. This was no easy task for a country with competitive railway systems widely differing in geographical location, in the standard of their development, and in the character of the through and local traffic and their several interests, and it demanded wide experience, mature judgment and additional expense to reach sound, broad-minded conclusions.

This act performed good service, but it did not produce absolute uniformity in accounting or statistics. It gave time for ample reflection, the development of uniform account headings, and the test of experience, and so paved the way for the practice of uniform accounting, but after nearly twenty years it was natural in this active young country that its provisions should be modified and the powers of the Interstate Commerce Commission extended. This was accomplished by the passage of the Act of 1906, known as the Hepburn Act, which was designed to regulate more important public questions than uniform accounting, but the provisions regarding the latter were materially broadened, and coupled with heavy penalties for non-observance, which caused little surprise, as the law was passed in the heat of public discussion as the concluding chapter in legislation against railroad rebates.

Under this law of 1906, amending the Interstate Commerce act of 1887, uniform accounts and statistics are now kept and reported to the Commission by all railroads.

Its general provisions regarding our subject are that the Interstate Commerce Commission (consisting of seven members appointed by the President of the United States, with the consent of the Senate, to serve for a period of seven years and devote their entire time and attention to the business of the Commission) is authorized to require annual reports from all railways engaged in interstate commerce and to prescribe the manner in which the reports shall be made, require specific answers to all questions upon which it may need information, and to prescribe a time within which all railways subject to the provisions of the Interstate Commerce act shall have, as near as may be, a uniform system of accounts and the manner in which such accounts shall be kept. The Commission has at all times access to all accounts, records and memoranda, subject to the act which regulates interstate commerce, and it is unlawful for railways to keep any other accounts, records or memoranda than those prescribed or approved by the Commission, and the latter may employ special agents or examiners with authority to examine any and all accounts, records and memoranda kept by the railways. In case of refusal to keep the accounts, records and memoranda or to submit same to the inspection of the Commission or its authorized examiners, a forfeit of $500 for each offense is recoverable by the government of the United States.

False entries, mutilation of records, or the keeping of accounts or records other than those prescribed or approved by the Commission is a misdemeanor, and, upon conviction in a proper court of the United States, a fine or term of imprisonment or both fine and imprisonment may be imposed.

Examiners (employed by the Commission) are subject to fine and imprisonment if they improperly divulge any facts or information coming to their knowledge.

The annual reports are made under oath for the twelve months ending June 30th in each year, and must be filed before the 30th day of September next following, unless additional time is granted by the Commission. If the reports are not filed or specific answer is not made to any question authorized by the provisions of the act, the railway in default shall forfeit to the United States the sum of $100 for each and every day such default exists. The Commission also has authority to require railways to furnish monthly reports of earnings and expenses, and to impose the forfeiture above provided. The Commission may prescribe the forms of any and all accounts, records and memoranda to be kept by the railways, including the accounts, records and memoranda of the traffic movement as well as of the receipts and expenditures of money.

In this same period the powers of the state railroad and public service commissions were also extended, and by co-operation between the state commissions and the Interstate Commerce Commission, a general scheme of uniform accounting has been established, based on the uniform accounting system previously used, and revised with the advice and assistance of railroad officers. The railways in every reasonable way have tried to observe the system, and assist the Commission, so that the classification promulgated thereunder may be universally used by all lines, become permanent, and satisfy all essential demands of the governing powers, as well as those who have furnished the money to construct and successfully administer the railroad lines of the country.

With the exception of a few principles, the uniform accounting system adopted by mutual co-operation, and made compulsory by law, will prove practical in working, especially if dominated by good sense and patience on both sides, and if the constitutional principles of railway regulation and supervision, to which the state and National governments are committed, are observed in lieu of railway control or administration apparently sought to be obtained through accounting or other methods, without assuming the responsibility of ownership and management. Under private ownership and governmental supervision and regulation, the railways have grown in less than eighty years to a commanding position, and have been the chief agencies which have populated the country, developed its manufacturing, agricultural, mineral and other resources, carried prosperity with them, and while their total net revenue has materially increased, their rates to the public have steadily decreased. They have continuously improved the transportation service by capital expenditure ably seconded by the use of surplus income, which corrected the necessary bonus issues of capital stock in their early history for which no cash was paid, and have also borne the constantly increasing burden of various forms of taxation imposed by the very communities which were founded, and their material prosperity secured, by railroad construction and operation. The record of private ownership and governmental supervision judged from any reasonable standard therefore needs no defense.

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[Here follows an enumeration of the information required of the railways in sworn monthly and yearly reports to the Interstate Commerce Commission.]

DIFFERENCES BETWEEN OLD AND NEW CLASSIFICATIONS.

It will be interesting to note the chief differences between the mandatory new classifications placed in effect since 1906 and the rather optional old classifications, which are:

First.—The separation from railroad results of all revenues and expenses not incidental to rail transportation the revenues and expenses of which, if included in rail accounts, would impair the value of statistics compiled therefrom. All revenues and expenses not incidental to railway transportation are embraced under the classification of "Outside Operations."

Second.—The net amount paid to any other companies for the use of equipment instead of being an operating expense is now a fixed or obligatory charge against income—"hire of equipment"—because to the extent that it is necessary to hire equipment by paying rental therefor, a company is deficient in investing the capital necessary to furnish sufficient equipment for its own traffic and instead is using the capital of other companies by paying an amount supposed to represent interest thereon. This is not necessarily an evidence of bad management as the line may be part of a through route and dependent upon a connecting line for a large part of its traffic, and therefore not in a position to dictate whose cars shall be used. The company receiving a net payment for the hire of equipment cannot report it among its operating revenues, or as a deduction from operating expenses as heretofore, but must show it as a separate item under "other income," for the converse reason to that given above. It is interest on capital used by others. When the hire of equipment accounts, which of course covered principally the interchange of freight cars, were first established, it was ordered that of the per diem charge, which then had been fixed by the railroads at 50 cents, 12 cents thereof estimated to represent the cost of depreciation and maintenance should be either charged or credited to operating expenses, but as this amount was entirely an estimate, and as a large number of repairs had to be made entirely at the expense of the using company, it was afterwards concluded that the whole amount paid or received was more in the nature of a rent than as a reimbursement for repairs or depreciation. Since then this per diem charge has been as low as 25 cents instead of 50 cents, because under depressed business conditions all of the lines had many idle cars.

Third.—Joint Facilities Accounts: These accounts like hire of equipment can show either a debit or credit balance, dependent upon the extent to which a company uses the tracks, terminals or facilities of other companies. Their principal function is to eliminate duplication by showing the entire cost of operating any jointly used terminal, station, yard or tracks in the primary accounts of but one carrier, viz., the owning or operating company, instead of having these charges distributed between primary accounts of all the carriers participating in their use, and in this way show the true cost of operation, regardless of their final distribution through the use of the "Joint Facilities Accounts" of all companies concerned. They are also designed to show under the primary expense accounts first, the expenses of the company's owned and operated lines, and second the net expense of earning the revenue shown. In the United States it has become a general practice to use part of the tracks, terminals or facilities of other railway companies instead of constructing independent facilities, which would be a duplication of those existing and a waste of capital. Such arrangements generally require the joint user to pay to the owner a proportionate share, based on the number of trains, cars and engines, or other traffic units, of (1) interest on the valuation or cost of the tracks and facilities used and (2) of the cost of maintenance, operation and administration and taxes. Under the former methods the owning company would charge its operating expenses with all of the expenses of maintenance, operation and administration of the joint facilities used with another company or companies, and would include as part of its operating revenues or other income the rental received from the using company, and the using company would charge the entire rental so paid, *i. e.*, its share of the interest as well as the operating cost, to its own operating expenses or fixed charges, or depending upon the judgment of its officers, the rental, in whole or in part, might be used to affect the revenues, operating expenses or fixed charges of both companies, the practice being by no means uniform, but the amounts being reflected in the accounts of all companies, being gross and not net, led to considerable duplication. Under the present system of accounting, the amounts received from the use of joint facilities are separated and placed in special primary accounts. The proportion of the interest upon the cost or value of the joint facilities and the taxes received from the tenant company using the same is not considered as operating revenue, but is reported in the general income account as an item of other income under the heading of "Joint Facilities—Rents" and is regarded as interest return to the owning company upon such portion of its capital as is used by others. In the case of the using company it is regarded as an obligatory interest charge and shown under the heading "Joint Facilities—Rents," because to that extent it is paying interest upon the capital for tracks, terminals and facilities which another company has provided. The cost of maintenance, operation and administration of such joint facilities is shown in separate itemized debit and credit primary accounts so that only the net amount paid by a company becomes a part of its operating and maintenance expenses, and if a net amount is received it is treated as a separate and specific credit and reduces the expenses to the amount actually borne.

Fourth.—Formal depreciation charges on equipment have been made a part of operating expenses; and with the consent of the Commission, depreciation accounts may also be established for maintenance of way and structures.

Fifth.—Premiums realized on the sale of *Capital Stock* must be permanently carried in the balance sheet under capital liabilities, thereby specifically ear-marking the same for capital expenditures, and in this way prevent the possibility of their being merged with the profit and loss account and used otherwise than as above. This amount can be offset by any discount suffered on stock, but under the laws of many states, railroad companies are prohibited from selling their stock at less than par.

Discount on stock must be similarly carried in the balance sheet until extinguished by premiums realized on capital stock of the same class. If the stock is to be retired or converted this can be changed to profit and loss or against any premium realized on such stock at the date of its retirement or conversion.

Premium realized on bonds or funded debt must be credited to income in equal annual instalments during the life of the bond as will extinguish the premium, or credited to profit and loss. The credit to income in any one year must not exceed the amount of the annual instalment.

Discount on Bonds: The discount on bonds is similarly charged to income or to profit and loss. If the premium realized is greater than the discount on bonds, the latter may be deducted from the premium and the balance shown in the general balance sheet.

Discount on stock or bonds cannot be included in the cost of railway or equipment but must be shown and dealt with as above indicated. The preferable method would appear to be to at once charge the discount against profit and loss so as not to leave too much to posterity or trust to realizing premiums.

Sixth.—Expenditures for additions or betterments to the railway, or its equipment over the cost of replacing in like kind, or original cost, respectively, are not recognized as elements of operating cost and cannot be charged to operating expenses, but must be shown upon the general balance sheet as part of the cost of road or equipment.

The object claimed for the depreciation accounts was to guard primarily against an *over*statement or understatement of the net revenues by including such depreciation as part of the operating costs and to spread the charges for replacement evenly over the years rather than have the charge made or omitted as it suited the financial convenience or necessity of the railways, and the purpose of additions and betterments classification was to limit operating expenses strictly to maintenance and operating outlays and depreciation, and so guard against an *under*statement or overstatement of net operating revenues by excluding therefrom additions to, or improvements of, the property or equipment, and at the same time including therein all proper charges for replacement.

I may say here that while the provisions governing depreciation and additions and betterments are, from a theoretical standpoint, reasonably and logically expressed, and the underlying principle of absolute uniformity is preserved, yet from a practical standpoint, a certain amount of arbitrary control is exercised through the medium of these accounts, and proper operating results depend entirely upon their reasonable enforcement. *The provisions enter the domain of railway management in deciding what shall constitute an operating expense, and a capitalizable asset.* This is especially so when the fact is recognized that all additions and betterments are not proper items for capital issues, and should not from a practical standpoint be carried into the general balance sheet as a capitalizable asset. The accounting rule of the Commission for equipment replacements is open to objection in that it requires that operating expenses shall bear a replacement charge only to the amount of the original cost of the discarded or destroyed equipment, without regard to whether labor or material costs have increased, by this difference understating operating expenses, and also inflating the true value of the equipment. In valuing any asset on the balance sheet it is also desirable that if any deduction is to be made because any part thereof has been paid out of the surplus income, the fact should be clearly shown by deducting such amounts, either specifically or otherwise, before carrying the final cost of these so-called additions to, and betterments of, the road and equipment among the assets in the general balance sheet, and thereby avoid offsetting such payments by a rather obscure item on the liability side of the balance sheet as the accounting rules require.

An accounting system may be correct in theory, so far as operating expenses go, when it provides for operating, maintenance, replacement in kind, and depreciation charges, and requires all beyond these charges to be considered as an addition to or betterment of the property to be shown as a capital asset. Practically this is not the case, because it does not provide a reserve against shrinkages in tariff rates, the trend of which has always been in that direction; business depressions; increased taxes and other governmental charges; the greater cost of material and labor; or for contingencies based on sound business judgment and practices. Practical consideration of all these elements dictates that adequate charges to expenses for maintenance, operation, replacement and depreciation must be supplemented by the use of surplus income for such additions and betterments to the property, which do not materially increase the revenues of the railway, materially reduce its operating and maintenance expenses, or substantially add to the value of the property as a whole. Such expenditures should not enter into the balance sheet as part of the capital assets, *but such part thereof as may be non-productive should be charged off to the total operating and maintenance expenses,* before showing the net revenue from transportation operations; such charges to be clearly shown in the accounts so as not to impair the integrity of the operating statistics.

GOVERNMENTAL PURPOSES IN PROMULGATING UNIFORM ACCOUNTING.

The objects, so far as it is possible to ascertain them, sought to be accomplished by the Interstate Commerce Commission in promulgating a uniform statement of accounts were (1) to insure the statement of revenues and expenses of the railroads on a uniform and comprehensive basis, and by monthly reports, special reports and annual reports keep investors, railroad patrons, shippers, traders and the governmental authorities in possession of the facts; second, to exclude from operating expenses the cost of all additions and betterments and carry the same into the general balance sheet as part of the cost of the railway or its equipment and at the same time insure the inclusion of all proper charges in operating expenses; third, to satisfy, amid the widespread discussion of rates and the general demand for a flat two-cent rate per mile for passenger traffic, the desire for a uniform system of accounting to compare and separate operating costs, the assumption being that after a reasonable return was paid upon the amount invested in the railroads, or upon a valuation thereof, railroads could be forced by legislative action to lower rates, and that the question of rates was inseparably connected with the cost of each service rendered; fourth, that the use of railroad bonds as security for the issue of emergency currency in time of stringency might be permitted, provided the Government were in possession of all of the facts regarding the railroads; fifth, to have the facts regarding railroad revenues and expenses stated in a uniform official method for use in the arbitration of labor disputes; sixth, so that the practice of governmental regulation through the agency of the Interstate Commerce Commission and uniform accounting directed by that Commission and enforced, if necessary, by periodical examinations by its agents and examiners, would lead to administrative supervision of the railroads as a business affecting the public interest, and for that reason should be controlled.

It is not clear to me just how that control can be justly and properly exercised without the responsibility attaching to ownership and without conflict with the powers as well as the constitutions and laws of the independent and sovereign states, under which the railroad corporations are created. To realize these objects would further require that, instead of following the constitutional method of reaching judicial conclusions respecting railroads through the courts of law, the Interstate Commerce Commission should be given judicial and inquisitorial, as well as administrative powers. Government by commission has not yet been sufficiently tested in America to enable one to speak with certainty of the results, nor have the Commissions yet reached the extent of the powers that will doubtless be conferred upon them, but whatever may be the final result—governmental control or administrative supervision, or whatever other term may be used—uniform accounting is here to stay, and the few creases that now exist in the structure will be ironed out in good time by the Interstate Commerce Commission and the railways, and no doubt the Commissions of the various states will concur in the final action.

THE A. B. C. OF RAILWAY CAPITALIZATION

By Frank Nay,
Comptroller, Rock Island Lines.

FROM A PAPER CONTRIBUTED TO "THE GOVERNMENT ACCOUNTANT."

"Most of the literature in regard to railroads," says Mr. Kirkman in his "Science of Railways," "emanates from men unfamiliar with their affairs. It is, as a rule, severely critical. Men who have filled prominent railroad offices without being railroad men have also favored us. Their views are optimistic and afford food for demagogues only. Railway men have little leisure to devote to abstract thought. Moreover, the labor of correcting the misrepresentations of the class referred to is too Herculean a task to be undertaken lightly. Time alone is equal to this.

"What is needed in discussing railway questions of public concern is common honesty based on experience and knowledge of economic laws. Faithful portrayal is impossible otherwise."

Why the literature referred to by Mr. Kirkman should be so uniformly critical, it is difficult to understand. It is questionable if any other business enterprise now in existence has done so much for society as railroads. It is also questionable whether any other business enterprise has contributed so much to the enhancement of the value of property. Railroads have been constructed through waste portions of the earth where houses were few and far between, and land selling from one to five dollars per acre, and within a few years villages would spring up, farmers would move in, and the land would be selling from fifteen to twenty and twenty-five dollars per acre and upwards. If all the railroads in the United States should stop running for one week, widespread suffering would be the result.

Scarcely any man has wealth enough to pay for the construction of any considerable amount of railroad, and hence it is necessary that our Government authorize the corporations to be formed for the purpose of constructing, maintaining, and operating railroads. These corporations are formed under laws of the various states, and, with respect to rates on interstate traffic and detailed annual report requirements, are under the supervision of the Interstate Commerce Commission.

A certain amount of capital stock is authorized and a certain proportion is paid up in accordance with the laws of the state under which the corporation is formed. After the route is surveyed and the officers of the corporation are actually ready to begin the construction, the work of building the road is usually done by a contractor or a construction company which agrees to accept a certain number of shares of stock for each mile of road constructed and first mortgage bonds for certain amounts on each mile of road constructed, and these bonds and stock are usually issued by piecemeal, as fast as five or ten miles of road is built.

In this way the road costs the original corporation the par value of the stock and bonds. The construction company or contractor negotiates the sale of the bonds and stock in the open market, and if they sell at a premium, the profit is his, or if they sell at a discount, the loss is his, and must come out of the profit which he makes in the construction of the road.

Frequently railroads are built by railroad companies direct instead of employing a contractor, and then the money is usually advanced, and from time to time, as it is needed on certificates of the engineer in charge of the work and of the accounting officer showing the work done and the money expended, bonds are issued by the trustees of the mortgage and delivered to the railroad, which sells them in the open market to reimburse it for the money advanced for the construction of the road.

After a road has begun to be operated it is fashionable to consider it as completed; while, as a matter of fact, it is never completed. New sidetracks, new buildings, new machinery, new appliances, new bridges, interlocking plants, and all sorts of improvements are being made constantly from month to month, and hence the actual cost is not at all represented by the expenditure which has been made up to the time when the road is put into operation. For example, a certain railroad which was incorporated about fifty-five years ago, is spending about three and a half million dollars per annum for additions, improvements, and betterments to the property. The reasons for such expenditures are to increase and improve existing facilities, provide better service, and to generally improve the means and appliances for handling business.

The par value of the bonds and stock issued and given to contractors, construction companies, or to the railroads which furnish the money to cover the cost of construction, constitute what is known as the capitalization of the road. To this is then added the par value of the bonds and stock that are subsequently issued for additions, improvements and betterments to the property. Frequently separate bonds are issued to cover purchase of equipment. Sometimes such bonds are called equipment bonds and at other times they are called car trust notes or certificates. In either case they are a first lien on the equipment until they are paid off.

Under the head of "Stock" there are two classes which are well known in the United States, namely, "common stock" and "preferred stock." Sometimes the voting power is in the common stock, and in such cases the preferred stock is virtually a mortgage on the property. In other cases the voting power is in both common and preferred stock, and usually in such cases the only difference between preferred stock and common stock is that the holders of preferred stock must receive a certain dividend before anything is paid on the common stock. As for example, 5 per cent preferred stock would mean that the holders of such preferred stock must receive 5 per cent per annum in dividends before anything is paid on the common stock. After 5 per cent is paid on the preferred stock the remaining income is applicable to the common stock, and if it is sufficient a dividend of 3 per cent may be declared by the board of directors on the common stock, or if the remaining income after paying 5 per cent on the preferred is sufficient to pay 7 per cent on the common stock, the directors may declare a dividend of 7 per cent on the common stock, and in that case the dividend on the common stock would be greater than the dividend on preferred stock.

The preferred stock may be either cumulative or non-cumulative. If cumulative it would mean that if for one year the income was sufficient to only pay 3 per cent on the 5 per cent preferred stock; the following year 7 per cent might be paid on the preferred stock if the income was sufficient, thus paying 5 per cent for the current year and the deficit of 2 per cent for the preceding year. If preferred stock is non-cumulative each year stands on its own basis, and if one year the income is not sufficient to pay the full 5 per cent no more than 5 per cent could be paid in any subsequent year.

In a few cases there are two classes of preferred stock: First preferred and second preferred, which means that the first preferred must go ahead of the second preferred in the same manner that ordinary preferred stock comes ahead of the common stock. A few companies issue what is called debenture stock, which is virtually a mortgage on the property.

For convenience in financing, the mortgages, which are usually executed by a trustee, commonly provide for the issue of mortgage bonds usually for $1,000 each; such bonds are generally in two forms, namely, coupon bonds and register bonds. The coupon bonds are payable to bearer and may be transferred from one holder to another without the transfer being recorded on the books of the company. Coupons are attached to such bonds covering the semiannual interest, and such interest is payable to bearer on presentation of the coupon. The original mortgage is deposited with and held by the trustee named in the mortgage. The trustee must certify to all mortgage bonds issued and see that the bonds are issued strictly in accordance with the terms of the mortgage.

The mortgages covering the issue of these bonds are first, second, third, equipment mortgages, collateral trust mortgages, etc. The first, second and third mortgages are mortgages on the property of the railroad company direct and take preference in the order named just the same as mortgages on real estate. The interest is payable by the trustee out of the funds which must be deposited with him from time to time as it falls due.

The equipment mortgages, as their name indicates, are mortgages on equipment purchased and usually do not run for so long a time as the mortgage on the entire railroad property.

Collateral mortgages, as the name indicates, are those secured by collateral in the shape of stocks, bonds or other securities of railroad and other companies. Such collateral mortgages are not a lien direct on any property.

In years gone by the rate of interest was much higher than at the present time. Many old railroad mortgages exist which are paying 6 per cent and 7 per cent interest, while the mortgages that are now written are for 4 per cent and 4½ per cent. Therefore it is the common practice for railroads at this time to issue first and refunding mortgages, which means that such first and refunding mortgages provide for taking up the old obligations bearing high rates of interest as they fall due, and of course, when all prior obligations are taken up the more recent mortgage becomes a first lien on the property. The public is frequently misled by the large amounts of such first and refunding mortgages. As for example, the Rock Island first and refunding mortgage, which was issued in 1904, authorizing first and refunding mortgage bonds to the amount of one hundred and sixty-three millions of dollars, provides for refunding of all the prior obligations of the Rock Island, which mature on or before April 1, 1934; many of these first and refunding bonds will not be issued until those obligations mature, which will be many years hence. Of the entire amount of $163,000,000, only about $86,000,000 have been issued up to this time.

When a large amount of new equipment is purchased, mortgage bonds are not always issued in that name, but car trust certificates are frequently issued, which are a first lien on the equipment, or provide that the equipment is simply leased to the railroad company until it is fully paid for. In stating the capitalization of a railroad, such car trust certificates should be classed as funded debt just the same as mortgage bonds. More might be said on the subject of bonds and stock, but I trust that enough has been said to give a fair idea as to the class of obligations, which are included under the general term of "Capitalization of Railways."

The Interstate Commerce Commission has been very useful in gathering statistics of railways and thus enabling those interested to become informed in regard to the railway situation. Their annual reports are published in printed forms and are accessible to all citizens; yet, I seriously question whether those volumes of interstate reports have been carefully studied by those who criticise the capitalization of railways. In fact, I am certain that many such critics have not looked inside of these reports. The latest volume published covers the results of operation for the year ended June 30, 1909, and the financial condition as of that date. This report (pages 54 and 55) shows that on June 30, 1909, the total capital stock of all railways in the United States aggregated $7,686,278,545; the total funded debt on the same date aggregated $9,801,560,390; a total capitalization of $17,487,868,935 for 235,402 miles of road (page 16), or an average per mile of road of $74,289. A superficial look at this figure would indicate that it is very large and sustains the theory advanced by many that railroads are overcapitalized. That is where many make a mistake. They conclude that they have found just what they were looking for and stop there, or they have not the industry to analyze the figures and see what they really mean.

Many railroads own capital stock and mortgage bonds of other railroads. As for example, the Chicago, Rock Island and Pacific Railway Company owns all of the first mortgage bonds of the Chicago, Rock Island and El Paso Railway Company. The mortgage bonds of the Chicago, Rock Island and El Paso Railway Company are not on the market, but are deposited with the trustee of the Chicago, Rock Island and Pacific Company's mortgage, where they must remain until the Chicago, Rock Island and Pacific mortgage is paid off or released. Thus it will be seen that practically two mortgages are issued covering the Chicago, Rock Island and El Paso Railway, but only one is in the hands of the public. * * * In order to determine the capitalization per mile of line which represents obligations on the railroad property and other assets and which calls for support in interest and dividend payments out of net operating income, it is necessary to eliminate this duplication of stocks and bonds of certain railroad companies owned by other railroad companies.

The Interstate Commerce report for 1909 (page 55), shows that of the total capitalization of all railroads in the United States, viz., $17,487,868,935, the amount outstanding in the hands of the public, June 30, 1908, was $13,914,302,363. Deducting from that amount the capital assigned to other than railway property the Interstate Commerce report says that the remainder is $13,711,867,733, an average per mile of road of $59,259, which may still look large to those who, thinking of capitalization per mile of road, have in mind a mile of single track road across the country, not including equipment, other tracks, etc. To those seeking facts, it is necessary to ascertain what property is covered by this capitalization of $59,259 per mile of road.

The interstate report shows (page 16) that on June 30, 1909, there were 24,572.52 miles of second, third and fourth tracks, which, it is safe to assume, cost $25,000 per mile; while second tracks, as a rule, require no additional right of way, the second, third and fourth tracks are where the traffic is very heavy; they are laid with heavy rails, the ballast is of the best, and the track in every respect is first class.

This report (page 16) also shows on June 30, 1909, the roads own 82,376.63 miles of yard track and sidings, which, taking into consideration the fact that this item includes large terminals as well as country sidings, it is fair to value at $12,000 per mile. The report also shows that the railroads owned 57,212 locomotives, and a fair average cost per locomotive would be $15,000; the report further shows that railroads owned 45,584 passenger cars, and a fair average cost per car would be $7,000. The report further shows that the railroads owned 2,202,552 freight cars, which it is fair to assume cost an average of $800 per car.

In order to get at the capitalization of one mile of track owned June 30, 1908, it is, therefore, proper to deduct from the total capitalization in the hands of the public these five items, namely:

24,572.52 miles 2d, 3d, and 4th track at $25,000 per mile....	$ 614,313,000.00
82,376.63 miles yard track and sidings at $12,000 per mile....	988,519,560.00
57,212 locomotives at $15,000 each........................	858,180,000.00
45,584 passenger cars at $7,000 each......................	319,088,000.00
2,202,552 freight cars at $800 each.......................	1,762,041,600.00
Total	$4,542,142,160.00

Deducting this amount from the railway property capitalization in the hands of the public, viz.: $13,711,867,733, will leave the net capitalization for 235,402 miles of main track operated, namely, $9,169,725,573. This figure includes bridges, shops, depots, section houses, water stations, interlockers, general office buildings, furniture, etc.; in short, every part and parcel of the property and assets except second, third and fourth tracks, sidings and rolling stock. The average per mile of main track, including all the appurtenances except other tracks and rolling stock, is only $38,953. This does not seem to be a heavy capitalization per mile of main track when it is realized that this average covers all the miles of road in the United States; the eastern trunk lines, where work of construction has been brought to the highest development, and the roads through the various mountainous regions of the country, an inspection of some of which would cause one to wonder how the road could be constructed at any cost, as well as the less expensive construction through the open prairies. Certainly the cost of these roads in their present state of development is in excess of $39,000 per mile of main track.

No two miles of railroad cost exactly the same. I have kept the accounts of railroad construction as the work progressed in nine different states and know that the original cost at time such lines were put in operation varied from $18,000 per mile to $70,000 per mile. Some individual miles cost less than $18,000 and some other individual miles cost $500,000, not including equipment. Some miles of yard tracks in large terminals where right of way is expensive cost more than some miles of main track on the level prairie.

An idea as to the average capitalization per mile of track for all kinds of tracks may be obtained by adding together the main tracks, second, third and fourth tracks and siding and spur tracks, making a grand total of 327,511.41 miles of railroad tracks. Then divide that total into the capitalization in the hands of the public, $12,833,-591,510, less the estimated cost of rolling stock hereinbefore given, viz., $2,931,766,000, leaving $9,901,825,510, will give an average per mile for all tracks of $30,234. I do not believe any man at all familiar with the construction of railroads will say that the cost per mile for all tracks all over the United States was less than $30,000, including every bridge, building and appurtenance of every kind as they exist today, except rolling stock.

In the foregoing, the basis of capitalization of railroads is their cost. As railroad financing is carried on today, it is entirely proper and regular for a railroad property to be capitalized at the cost of construction plus all of the additions, improvements and betterments to the property after the road is put into operation, and on this theory, which, I understand, is not questioned, a railroad property may be said to be over-capitalized when the total amount of stock and bonds or other liens on the property in the hands of the public exceed the total cost of the property up to the date the stock and bonds are placed in the hands of the public. If the total capitalization in the hands of the public is less than such cost, a railroad is said to be under-capitalized.

From the foregoing, I have tried to make it plain that in order to consider fairly and honestly whether the railroads are over-capitalized or under-capitalized, it is necessary to consider the cost of construction plus expenditures for additions, improvements and betterments. I have shown that the present capitalization of railways in the United States averages $38,953 per mile of single track of all roads. In order to show how this capitalization fluctuates with the character of the company and the standard of excellence of railroad property, I give below a statement of figures taken from the Interstate Commerce report for the year ended June 30, 1909, which shows the capitalization in each of the ten groups into which the United States is divided by the Interstate Commerce Commission.

In this statement it will be noticed that the heaviest capitalization per mile of road is just where we know the cost of construction is greatest, namely, in Groups I, II, III and X. The first three groups comprise the New England and Middle States, while Group X comprises the western and the greater portion of the Rocky Mountain States. The largest capitalization per mile of line is in Group II, comprising part of New York and Pennsylvania; all of New Jersey, Delaware, Maryland, and part of West Virginia. This is in a section of the country where it is rough and mountainous, and also where the heaviest traffic of the United States is located, thus requiring the best facilities and service. It is found that the lowest capitalization per mile of road is in Group IX, comprising Louisiana, west of the Mississippi river; part of Texas and New Mexico, a comparatively level country, where railroad construction is probably cheaper than in any other part of the United States; the traffic is lighter in this group than in any other.

CAPITALIZATION OF RAILWAYS IN THE UNITED STATES
JUNE 30, 1909

I.	All of New England	7,999	$ 770,088,583	$ 96,273
II.	Part of New York and Pennsylvania; all of New Jersey, Delaware, Maryland; part of West Virginia	23,887	3,422,797,720	143,291
III.	Ohio, Indiana; southern part of Michigan; part of New York and Pennsylvania	26,037	2,308,544,800	88,664
IV.	Virginia, North Carolina, Carolina; part of West Virginia	13,785	949,422,537	68,874
V.	Kentucky, Tennessee, Mississippi, Alabama, Georgia, Florida, and part of Louisiana, east of the Mississippi River	27,488	1,315,678,613	47,863
VI.	Illinois, Wisconsin, Iowa, Minnesota, northern Michigan; part of North Dakota, South Dakota, and Missouri, east of Missouri River	51,602	2,992,909,580	57,999
VII.	Montana, Wyoming, Nebraska; North Dakota and South Dakota, west of Missouri River	12,418	834,477,407	67,199
VIII.	Kansas, Arkansas; part of Missouri, Colorado, and Texas; Oklahoma Territory; Indian Territory; part of New Mexico	33,284	2,180,649,842	65,516
IX.	Louisiana, west of Mississippi River; part of Texas and New Mexico	17,714	766,150,296	43,251
X.	California, Nevada, Oregon, Idaho, Utah, Washington, Arizona; part of New Mexico	21,188	1,947,149,457	91,899
	Total	235,402	$17,487,868,935	$74,289

NOTE: Interstate Commerce Commission's report does not show capitalization in hands of public in each group, hence in dealing with capitalization by groups it is necessary to use gross figures. As shown on a preceding page, the total net capitalization of the railways of the United States in 1909 was only $13,711,867,703, or 59,259 per mile of line. This would subject the figures in the above table to an average discount of over 20 per cent. In some groups this percentage runs much higher.

THE MEASURE OF A REASONABLE RATE

By W. W. Finley,
President of the Southern Railway Company.

AN ADDRESS BEFORE THE TRAFFIC CLUB OF PHILADELPHIA AT PHILADELPHIA, PA., FEBRUARY 18, 1911.

Mr. Toastmaster and Gentlemen:

This banquet, in which representatives of the shippers and the carriers get together socially, is typical of what we should endeavor to do in a business way. We should seek to get together and avoid controversies by an intelligent understanding of the economic principles which underlie our business relations. That we have not always been able to avoid friction in the past has been due, in large measure, I believe, to a failure on the part of railway men as well as shippers to understand clearly these fundamental principles. I shall, therefore, devote the time allowed to me this evening to a discussion of some of the fundamental matters as to which it is important that shippers and carriers should arrive at a common understanding.

In the early days of transportation by rail it was not recognized that a charge for a transportation service rested on any different economic basis than a charge for any other service or for any commodity. Charges for individual services were, to a large extent, a matter of bargain. If a shipper could not secure from one carrier a rate which was entirely satisfactory to him he would offer his business to a competing carrier, or a carrier would seek to secure business from a competitor by offering lower rates. As an inevitable result there were wide differences in charges for services rendered under substantially similar circumstances and conditions. In time, it came to be recognized that charges for transportation by rail stand on a different economic basis from other charges, for the reason that the railway company owns a highway over which it must exercise a monopoly of carriage.

As a result of the universal recognition of this peculiarity of railway charges we are now all agreed that undue discrimination between individuals, communities, or commodities, when service is performed under substantially similar circumstances and conditions, are economically wrong and may properly be forbidden by law. We are also in agreement, as a matter of principle, that all charges for transportation services should be just and reasonable. It is only when we come to the question of what is a just and reasonable charge for a specific service that we are in danger of disagreement.

About a month ago, in an address which I delivered before the Traffic Club of Washington, D. C., I stated, what I had said on previous occasions, that "the only just method of determining the reasonableness of transportation charges is to measure them by the service performed." A newspaper, in commenting editorially on my address, said, in effect: "This is all right as far as it goes, but will not Mr. Finley tell us just how to apply this yardstick?" That is what I shall attempt to do this evening.

In order to lay a broad and firm foundation, I shall first state some underlying facts and principles which I believe to be self-evident.

At the outset, it should be borne in mind that the railways of the United States—although public highways, and, as such, properly subject to such governmental regulation as will insure to all citizens equality of rights on them, under similar circumstances and conditions, and as will prevent unreasonable or extortionate charges—have, nevertheless, been built with private capital and are the private property of their owners.

It is a fundamental economic truth that the investment of funds in any class of property is dependent on the safety of the principal and the rate of profit that may be expected as compared with the rate that can be earned on investments in other kinds of business. In other words, the flow of capital into any particular business will be retarded unless it may be expected to earn a reasonable profit as compared with the earnings of capital in other enterprises. The wise men who framed the Constitution of the United States took cognizance of this principle when they threw the protection of that supreme law of our land about private property in language which the profound lawyers who have composed our Supreme Court have held to cover not only the property itself, but the right to its profitable use. Thus, as the Supreme Court said, in the case of *Chicago, Milwaukee & St. Paul R. R. Co.* v. *Minnesota:*

"If the company is deprived of the power of charging reasonable rates for the use of its property, and such deprivation takes place in the absence of investigation by judicial machinery, it is deprived of the lawful use of its property, and thus, in substance and effect, of the property itself, without due process of law and in violation of the Constitution of the United States; and in so far as it is thus deprived, while other persons are permitted to receive reasonable profits upon their invested capital, the company is deprived of the equal protection of the laws.''

Thus the constitutional standard and the economic standard for the fixing of a charge for any specific service by a privately owned railway are the same. It must be reasonable, as measured by the service performed. It is the common law rule that he who performs service, in the absence of a specific contract, is entitled to just compensation for that service, and it is this rule which has governed the courts of England for centuries, and of our own country from colonial times, in determining all controversies as to prices of commodities and charges for services.

The United States Interstate Commerce law provides that ''all charges made for any service rendered or to be rendered in the transportation of passengers or property * * * shall be just and reasonable.'' This is simply the legislative enactment of the constitutional and economic standard to which I have referred.

The standard is thus clearly established. It is the right of the carrier to receive reasonable compensation for each service, as measured by that service. That the application of this standard, in specific instances, may be difficult does not excuse failure to apply it. It is being applied with more or less exactness in the practical every-day fixing of charges by the railways and in the cases before the Interstate Commerce Commission and the courts involving the reasonableness of specific charges.

The question of what is a reasonable charge for a specific service is complicated by the fact that neither as a matter of transportation policy or of public policy can charges on all classes of traffic be uniform. Commodities of great weight or bulk in proportion to their value must be carried at rates substantially lower than those which may properly be charged for the carriage of commodities which are of high value in proportion to their weight or bulk.

As a result of the necessity for different rates on different classes of commodities, each individual rate or each rate applying to a class of commodities must be considered on its merits in its relation to the particular service performed. The cost of performing the service, as nearly as it can be ascertained, must certainly be taken into consideration. No rate should be made so low as not to pay something more than what Mr. Acworth, the eminent English economist, has aptly termed "the actual out-of-pocket cost" of moving that particular traffic. If it pays this cost and contributes, even in small measure, toward the general expenses and fixed charges of the carrier, it is a profitable rate, provided the carrier has a considerable volume of traffic moving at higher rates. The low-class traffic moved at these low rates is not a burden on the higher-class traffic, for, by just so much as it contributes to general expenses and fixed charges, it reduces the amount which the higher-class traffic must contribute. In practical rate-making the question of the cost of the service has a controlling bearing only as determining the level below which a rate cannot properly be made.

The value of the service is another important factor in rate making and in determining the reasonableness of a rate that may be challenged. Transportation enables those engaged in any given industry to carry on their business in those localities best suited for it and to market elsewhere the surplus not needed for consumption at the point of production. By moving commodities from places where the supply exceeds the local demand to places where they are scarce and are wanted, additional value is given to the whole volume of production—including the proportion consumed locally, as well as to that carried to other markets. As affecting the consumer of, let us say, cotton goods—by way of illustration—the carriage of the raw cotton to the mill and the transportation of the finished goods to his market, is a process of production. This transportation gives added value to the raw cotton produced on the farm and to the goods produced in the cotton mill, and the carrier is, therefore, entitled to fair recognition for its service in the process of producing the finished cloth and placing it in the hands of consumers, just the same as is the farmer and the cotton mill owner.

The increased value given to a commodity by transportation is the measure of the value of the service to the owner of the commodity. It is not, however, the absolute measure of a reasonable rate, for, if the transportation charges were so high as to absorb all of this increased value, the owner would have no incentive to ship and the traffic would not move. This may be illustrated by referring to the rail movement of a very low-grade commodity, such as ordinary sand—a commodity which is found in abundance in most localities and the value of which, generally speaking, can be very little increased by transportation. It is manifest that it would be impossible to make a practical rate on sand for any such distance as from Philadelphia to Chicago, for the reason that the out-of-pocket cost of performing the service would be far in excess of the value of the service to the shipper.

As transportation has contributed all of the increased value which is given a commodity by its carriage to market, which, as we have seen, is a factor in effective production, the carrier is entitled to a reasonable share of that increase. The value of the service is, therefore, a most important factor in determining what is a reasonable charge for a specific transaction. Out of the intimate relation of the cost of the service and the value of the service to the reasonableness of a transportation charge grows the fact that, in an era of generally advancing prices, when both the cost of the service and the value of the service are increasing, the level of the reasonable charge for the service thus affected also advances.

In determining the proportion of the value of the service which the carrier may reasonably and justly charge for its part in creating that value, intelligent consideration must be given to comparison with rates charged by the carrier for other similar services, to comparison with the rates of competing carriers, to comparison with the rates at which carriers in other localities move the same commodity under similar circumstances and conditions, to comparison with the rate on similar commodities which might be substituted in use for the one in question, to the intrinsic value of the commodity, to the risk of breakage or other injury in transit, to the insurance risk, to the effect of the rate on the volume of traffic, and to the general condition of the business to which the special traffic is related. When the reasonableness of a rate is called into question, consideration and great weight must be given to expert testimony.

Of all these guides for determining the reasonableness of a specific rate, the effect on traffic is perhaps the most important, for an increasing volume of traffic is prima facie, and almost conclusive, evidence that the rate is not unreasonably high, though it may be unreasonably low.

It will be seen that, in the final analysis, the reasonableness of a transportation charge is largely a matter of expert judgment. So is the reasonableness of any price or charge that may be called into question. If one of you employs a lawyer, without any agreement as to what his fee shall be, and, after the service has been performed, you decline to pay his bill on the ground that it is too high, he sues you for the amount of his bill. The question raised is what would constitute a reasonable charge for the service performed, and, on this, testimony will be introduced to show, primarily and principally, the value of the service to you. Testimony will also be presented as to the usual fees which this lawyer and other lawyers receive for similar services, as to the amount of time consumed, and the skill which he displayed in rendering the service. Based on this testimony the jury will form a judgment as to what is a reasonable charge for the specific service performed. The same method is followed in condemnation proceedings when a railway company seeks to acquire land for railway purposes and fails to reach an agreement with the owner as to the price to be paid. The question here presented is as to the fair and reasonable present value of the land to its owner and as to the fair and reasonable amount to be allowed him for the damage, if any, that may result to his remaining property by the construction of a railway through it. Evidence will be considered as to the value of that particular strip of land, as to the profitableness of the uses to which it has been put by its owner or of the uses to which it might be put. Evidence will also be considered as to the prices at which other tracts of land in the same locality have been sold, and on all these points expert testimony will be considered. The amount which the owner paid for the land, if bought sufficiently near the time of condemnation to be pertinent, may be introduced in evidence and will be considered, but it is not controlling on the jury, which, from all the evidence introduced, must determine what is the just and reasonable compensation to its owner at the particular time when it is taken.

You will note that I have said nothing as to the cost of a railway, its value, or its capitalization as factors in determining the reasonableness of any specific transportation charge. The reason is that, while it is essential to the continued development of the railway system of the United States that the whole body of charges shall be such as to yield such profits as will attract capital to investment in railway enterprises, neither cost, value nor capitalization can have any controlling bearing on the reasonableness of any particular charge for a specific service by any particular railway.

Every railway traffic official strives to obtain such an adjustment of each charge for a specific service as will result in the total charges for all services rendered by his company yielding a maximum of revenue. When he comes to the fixing of any specific charge, however, he finds that his discretion is limited very narrowly by economic forces entirely beyond his control. He must consider the competition of other carriers. He must consider the competition of producers in localities off of the line of his road who are marketing the same commodity in the same markets as the producers on his road. He must consider the competition of markets which are seeking to draw commodities produced along his line away from the markets which it serves. He must consider the competition of similar commodities which may possibly be used in substitution for the one affected by the specific charge under consideration. These competitive forces, and the necessity for so adjusting the charge as to encourage the movement of traffic, effectively fix a level above which he is powerless to advance the charge. He cannot give practical consideration to either the cost of the railway, its value, or its capitalization. If it were otherwise, and if, as seems to be believed in some quarters, transportation charges could be so adjusted as to yield a certain return on railway capital, every railway would be profitable to its owners and such a thing as a bankrupt railway company would be unknown, unless caused by dishonesty or mismanagement.

Transportation charges being controlled so largely by the competitive forces to which I have referred and by the necessity of keeping each charge below the maximum of the value of the service in order to insure the movement of traffic, it follows that the intelligent railway manager, having in view the ultimate interests of the property intrusted to his care, will seek so to adjust each specific charge that it will be reasonable as measured by the specific service. If, through faulty judgment or for any other cause, he shall err in the fixing of any specific charge, his error may be corrected by the machinery which the law has provided for the correction of any charge that may be unreasonable as measured by this standard.

When the specific charges of a railway company have been so adjusted that each is reasonable, as measured by the service performed, and when that company abstains from any undue discrimination in charges or service between individuals, localities, or commodities, if, by reason of the poor location of the railway, high cost of construction, faulty management, or any other cause, the revenues derived from all of its charges are so small as to yield no net return on its capitalization, that is the misfortune of its owners. On the other hand, if by reason of the favorable location of the road, low cost of construction, efficiency of management, or any other cause, the net return to the owners of the property is substantial, that is their good fortune. They are entitled to the use and enjoyment of the whole of such net returns in the same measure as the farmer whose land is fertile and is favorably located is entitled to the use and enjoyment of all that he can make out of his farm by the most efficient management.

While it was not a case involving railway rates, I believe that the views announced by Justice Brewer of the Supreme Court, in *Cotting* v. *Kansas City Stock Yards Company,* lay down, in clear and unmistakable language, the rule which should be applied to the determination of the reasonableness of any railway charge. Speaking of a person who has devoted his property to a public use, Justice Brewer said:

"The state's regulation of his charges is not to be measured by the aggregate of his profits, determined by the volume of business, but by the question whether any particular charge to an individual dealing with him is, considering the service rendered, an unreasonable exaction. In other words, if he has a thousand transactions a day and his charges in each are but a reasonable compensation for the benefit received by the party dealing with him, such charges do not become unreasonable because by reason of the multitude the aggregate of his profits is large. The question is not how much he makes out of his volume of business, but whether in each particular transaction the charge is an unreasonable exaction for the services rendered. He has a right to do business. He has a right to charge for each separate service that which is reasonable compensation therefor, and the legislature may not deny him such reasonable compensation, and may not interfere simply because out of the multitude of his transactions the amount of his profits is large."

In this case Justice Brewer clearly announces the rule which I believe should be applied to all questions affecting the reasonableness of railway charges. He clearly lays down the principle that the only question involved in the matter there under discussion was whether any particular charge for a specific service was an unreasonable exaction as measured by that service. He indicates that the value of the service to the person for whom it is rendered must be the principal factor in determining the reasonableness of the charge. This rule eliminates from consideration, except as I shall hereafter explain, all questions of capitalization and of the value or cost of the property used in performing the service by declaring explicitly that "the legislature may not deny him such reasonable compensation, and may not interfere simply because out of the multitude of his transactions the amount of his profits is large." The application of this rule to privately owned railways, which I believe to be proper and will ultimately be done, clearly denies to government the right to place any limitation on the amount that may be earned on railway capital. It would invite the people of the United States to invest their money in the great and honorable business of transportation with the assurance that the properties they create will have the equal protection of the laws and will be surrounded by the same safeguards as are thrown around property in other forms. It would encourage those engaged in this business to strive constantly to make their service more efficient by the adoption of improved appliances and methods with the assurance that they will be permitted to reap the profits of their enterprise and skill.

Further, in a time of advancing commodity prices and labor costs, the fact that the whole body of its transportation charges fails to yield a fair and reasonable return on the capital invested in a railway is presumptive evidence that there has been such an increase in the cost of the service and in the value of the service as to require a readjustment of charges upon a higher average level. This is but another way of saying that rates must be reasonable for, and under the conditions and circumstances of, the service. In the changed conditions growing out of higher prices for everything else a higher price for railway transportation becomes reasonable.

Under such conditions it is to the public interest that such a readjustment should take place, for the primary interest of the public in the railways is in adequacy of facilities and efficiency of service, and these can be provided, in a country with a constantly increasing volume of traffic, only when the average return on capital invested in railways bears such a relation to the returns on investments in other forms of property as to insure a constant flow of new capital into railway enterprises. In other words, the fair maintenance of the just credit of the railways is a circumstance which should be taken into consideration in determining the reasonableness of rates, not only in the interest of the railways, but in the interest of the public. In this connection, I think we may properly refer to the relation of the governmental policy of Germany to the wonderful industrial development that has marked the recent history of that country and is still in progress. It is not without significance that we find the highest court in the German empire saying:

"When in a branch of industry the prices of a product fall too low, and the successful conduct of the industry is endangered or becomes impossible, the crisis which sets in is detrimental, not merely to individuals, but to society as a whole. It is in the interests of the community, therefore, that inordinately low prices should not exist in any industry for a long time."

If this is true as to the prices of the products of any industry, I believe it is equally true of the charges of a railway, for transportation is a part of production, and, in our modern civilization, the prosperity of every industry and of every individual is affected, directly or indirectly, by transportation.

RETURN ON CAPITAL INVESTED IN MANUFACTURES, AGRICULTURE AND RAILROADS

By L. E. Johnson,
President Norfolk & Western Railway Company.

FROM ADDRESS BEFORE THE VIRGINIA STATE FARMERS' INSTITUTE, ROANOKE, JANUARY 12, 1911.

The statistics showing the revenue derived from capital invested in manufactures, agriculture, and railroads in the United States are, for the fiscal year ended June 30, 1905, as follows:

Manufactures.

Capital	$13,872,035,371
Number of salary and wage earners	6,718,618
Gross value of products	16,866,706,985
Cost of materials used	9,497,619,851
Total salaries and wages	3,623,589,623
Miscellaneous expenses	1,651,603,535
Net returns from products	2,093,893,976
Percentage net returns on capital invested in manufactures	15.09 per cent

Agriculture.

Capital	$30,043,000,000
Number of farmers and farm laborers	10,900,000
Value of products	5,738,850,000
Wages paid labor	393,690,000
Fertilizer	61,366,300
Taxes	225,322,500
Interest on capital at 7 per cent	2,103,010,000
Net return to farm owners	2,945,461,200
Percentage net reurns on capital invested in agriculture	9.8 per cent

RAILROADS.

Capitalization	$13,805,258,121
Number of salary and wage earners	1,382,196
Gross earnings	2,082,482,405
Cost of materials used	550,657,472
Total salaries and wages	839,944,680
Miscellaneous expenses	75,538,597
Net earnings	616,341,657
Percentage net returns on capital invested in railroads	4.46 per cent.

The above tables show the relation of the annual net return to each one thousand dollars of capital invested, as follows:

Manufactures	$151
Agriculture	98
Railroads	44

To produce one dollar of net returns it required $6.62 of capital invested in manufactures, $9.44 of capital in the case of agriculture, and $22.40 of capital in the case of the railroads.

The average salary-wage paid workers in manufactures was $539 and by railroads $607, the average salary-wage paid by the railroads being 12.6 per cent. greater than the average paid in manufactures.

For every one thousand dollars of expediture, $245 was paid in salary-wage in manufactures and $572 was paid by the railroads.

That the high salary-wage for the railroads was not caused by the heavy salaries of the administrative officers is shown by the fact that of the $839,944,680 paid in 1905 by the railroads in salaries and wages, but $15,155,278, or 1.8 per cent., went to the general officers.

Of the total expeditures for manufactures, but 24 per cent. was for salary-wage, while of the total expenditure for the railroads, 57 per cent. was for salary-wage.

AUTOMATIC SIGNALS ON GERMAN RAILWAYS

BY MR. HOOGEN.

(Zeitung des Vereins Deutscher Eisenbahnverwaltungen.)

(Translated for the Bulletin of the International Railway Congress, November, 1910.)

Attempts to supplement the visible signals by audible signals, as well as proposals to prevent one train from running into another, by means of special devices not depending on the attention of the locomotive driver, date back to nearly the beginning of railways. But such devices have only been used in very few cases and only during very short periods of time on German railways and on railways in other countries. Opinions both here and abroad still differ widely as to the conditions which such a system should satisfy. The first serious attempt, on German railways, to elucidate the question whether and under what conditions it would be advisable to supply auxiliary means for drawing the attention of the driver to the signals and for stopping the train in case of danger, was made in February, 1901, when at the invitation of the German State Railway Office representatives of nearly all the German States met in order to discuss what measures should be taken in order to increase the safety of the traffic. The agenda of this meeting included *inter alia* the following two items: ''Experiments for supplementing distant signals by audible signals'' and ''Devices for stopping a train by operating the compressed-air brake.''

The results which had been obtained by the combination of audible and visible signals were at that time considered unsatisfactory; it was therefore agreed to submit the question to a commission, which was to ascertain what devices were in existence, and to make tests; and which eventually might draw up proposals for the general introduction of such audible signals. Devices for stopping a train by operating the compressed-air brake from without were not considered expedient; but this question was also to be carefully investigated by the commission.

Experiments were thereupon made in Saxony with the ''crocodile'' contacts of the French Northern Railway, and with an audible signalling device operated by carbonic acid; in Baden a so-called ''distance'' brake was tried. In neither case were the results satisfactory. In Prussia, a special committee was appointed to examine the many inventions of this kind which were submitted;

but nothing useful was found. In the meantime, the German *Verein* had also been considering the question. The Austrian Railway Ministry addressed a letter dated 12 December, 1901, to the acting committee of the *Verein,* in which attention was drawn to the fact that in consequence of accidents which result from the over-running of signals standing at danger, there is a continual repetition of the demand for devices for showing the driver that the line is blocked, not only by means of the visible semaphore pole, but also by means of another audible or other signal on the locomotive, and in cases by the automatic operation of the brakes, by automatically cutting off steam, etc. Hence it would be advisable to consider this question, and the Austrian Railway Ministry therefore proposed that it should be determined, in the first place, whether such devices were really suitable for increasing the safety of the traffic to the extent desired. This proposal was brought before the technical committee, and referred by them to a subcommittee consisting of eleven members for consideration and report. It was subjected by them to very careful examination.

The sub-committee, after sending inquiries to all administrations belonging to the *Verein,* answered the question raised by the Austrian Railway Ministry, by stating that devices for informing the driver that a signal is at "danger" by means others than those at present in use (for instance, audible or other signals on the locomotive) are considered advisable, but that such devices must satisfy the condition of being absolutely reliable in their working. Devices which satisfy this condition are not known. Devices for automatically applying the brakes or cutting off steam, without the intervention of the driver, are considered inadvisable.

When the question was discussed by the technical committee at its meeting at Trier, 10-17 June, 1904, this adopted the answer proposed by the sub-committee, but expressed the opinion that in order to be absolutely reliable, the devices should at least satisfy the following conditions: 1° the device must not only show that the corresponding stationary signal is being approached, and its eventual position at "danger," but also any defect in the device which would prevent its proper action; 2° as far as stationary signals are concerned, the device must act soon enough to make it possible to stop the train with certainty before reaching the signal in question; 3° the perception of the signal must not necessitate any previous attention on the part of the driver; on the contrary, the presence of the signal must at once make itself apparent to the driver in an unambiguous way, under all the conditions which may arise on a locomotive. The indication must be given whether the locomotive is running chimney first or tender first. It must only act with trains running in the direction to which the signal in question applies; 4° the device may only stop acting if the locomotive is standing still. Any switches are only admissible if they are so constructed that the locomotive can not be started unless they are in the correct position; 5° the device must be arranged so that its action can not be stopped maliciously or unintentionally. The sign must not be given unintentionally by any obstructions on the track, which do not affect the running of the trains; 6° unauthorized persons should not be able to put a signal on or to pull it off; 7° the upkeep and supervision of the device must not be attended with any particular difficulty; 8° it must be possible to give the stop signal on the locomotive, without any particular difficulty or lengthy preparation, at each of the places so equipped, at any point that may be convenient.

These resolutions of the committee were adopted by the general meeting of the *Verein,* held at Danzig, 1-3 September, 1904. The next year a number of devices were again submitted, which were to satisfy the conditions as defined above. But at first none of the devices submitted proved to be satisfactory. Only towards the end of 1906 were a few devices submitted, which were sufficiently developed to make it advisable to try them. The administration of the Prussian State Railway thereupon started to make systematic trials of them in ordinary working, on a larger scale, devoting considerable funds to the purpose. Particulars of these trials, which had then just been begun, were published in the *Zeitung des Vereins Deutscher Eisenbahnverwaltungen,* 1907, No. 48.

The first trials there mentioned, with double-light distant signals, are completed. According to the decision of the council of 10 March, 1910, this pattern of distant signal is to be substituted for that formerly used. The results obtained in Saxony and on several large trial sections on the Prussian State Railway prove beyond doubt that the perceptibility of the distant signals in the night time is materially improved by this arrangement. It is to be expected that this alteration will be completed in a few years; the limit fixed for carrying it out is the end of 1919. No doubt a good effective distant signal will for a long time to come remain the most effective means for preventing the overrunning of the main signal. Hence it may also be expected that this improvement of the distant signal will make it easier to attend to the stop signals.

Experiments with combined detonating and visible signals have been made on the larger scale in the districts of the Bromberg, Cologne, Münster and Stettin directorates. The detonation and the light produced by the detonators used suffice to attract the attention of the driver. The attendance is simple, if it can be carried out from an existing signal cabin. The cartridges, usually three in number, are placed on the rail by a lever mechanism operated from the signal cabin. When this machine was intercalated in the wire transmission of the signal, in one of the directorate districts, difficulties arose, although the machine was in immediate connexion with the wire transmission of a block signal. The movement of the signal was so much impeded, that the machines had to be disconnected during part of the winter. Moreover during the trials doubts arose, whether persons and vehicles would not perhaps run considerable risks if such signals were used near habitations or streets running alongside the line. This would prevent their use for distant signals, which are more frequently overrun when standing at "danger." But even leaving this out of consideration, the detonating signal, which orginally represented a danger and stop signal, is hardly suitable for indicating that a distant signal stands at "caution."

In a further series of experiments, which were carried out by the Altona, Halle, Kattowitz and Stettin directorates, electrically-operated syrens and horns were placed in front of the distant signals. When the head of the train reaches a contact which is placed 300 metres (328 yards) in front of the distant signal, the latter standing at "caution," the syren or horn begins to sound and continues to do so until the head of the train reaches another contact placed 50 metres (55 yards) behind the distant signal. The control of the proper working of the appliance is effected by an indicator in the signal cabin. These experiments are not yet concluded. In the case of goods trains the sound of the syren has as a rule sufficed to attract the attention of the driver. In the case of passenger and express trains, the sound appears not to be sufficiently strong. In one case, the appliance had to be removed because people living in the neighborhood were inconvenienced by the loud sound of the syren.

While these devices are intended to notify, by an audible signal given from a stationary point next to the track, that a signal is being approached, the electric signal-indicator is intended to give the audible signal notifying the approach to a distant signal, on the locomotive itself. When the train approaches the distant signal, a brush fixed to the locomotive comes into contact with two fixed contact bars placed next to the track. The armature of a relay on the locomotive drops off, a red disk appears and an alarm is switched on, which the driver can again stop by a push.

The Hanover, Stettin and Breslau directorates have made experiments with this appliance. In Hanover two express, two passenger and two goods locomotives are equipped in this way; contact bars are placed before all distant signals of the home and block signals, both directions, on the very busy section Wunstorf-Minden. The results of these trials have not yet been wholly satisfactory. Minor defects in the indicators have, it is true, been gradually eliminated. The contact brushes have, however, been repeatedly damaged by ballast and by other objects projecting into the boundary of the loading gauge, although the steel-wire brushes seem particularly suitable for making proper contacts even when the locomotive oscillates, and for yielding to any obstructions. When running at high speed the appliance still sometimes fails to act.

The van Braam train-safety apparatus, on the other hand, attempts to solve the problem by purely mechanical means. It consists essentially of a pair of slippers mounted on the locomotive. If these slippers slide on raised treadles placed alongside the rails, a rod is pulled downwards. This moves a catch, which under ordinary conditions prevents two spindles from being turned by a spiral spring, which is in a state of tension. When the catch is disengaged, the spindles are turned by the spiral spring. This movement can be utilized for starting the compressed-air brake, for making a colored disk appear and for operating a recording instrument. Trials with the van Braam apparatus have been made on the Prussian State Railway in the districts of the Halle, Danzig and Breslau directorates. Ten express locomotives have been so equipped in the Halle district alone. Trials are also being made n the Hanover district. In these trials, in accordance with the opinion expressed by the meeting of 1901 and the resolutions, of 1904, of the technical committee of the German *Verein*, the action on the brakes has been eliminated, because it was thought that this might in course of time weaken the feeling of responsibility and the attention of the drivers; moreover, it would make the apparatus more complicated and consequently more unreliable. The recording instrument has only been tried in the Danzig trials, as it is not of great importance if the slippers only act at the distant signal, which it is permissible to over-run even when it is standing at "caution." We may, however, at once draw attention to the fact that in the case of experiments made with this apparatus it is primarily of minor importance, how the movement which the treadles produce on the locomotive is utilized. The chief difficulty consists in making the arrangements for the transmission reliable and durable. The experiments, particularly those carried out with great care by the Halle directorate, have given valuable information for determining the value of this apparatus. The turning on of the steam whistle is reliably effected at speeds of from about 20 kilometers (12.5 miles) per hour upwards, if the slippers and the treadles are in order. Unintentional turning on has occurred. It is true that there is not much risk of this, because as the van Braam apparatus is arranged, it is necessary for both slippers to be raised before the whistle or brake is affected. In several cases the slippers were broken, although special care was taken on the experimental sections that there should be the proper clearance. The cause of this is that a depression of 5 millimetres (3/16 inch) of the slippers suffices to make them strike objects, which are outside the loading gauge proper, but very near to its boundary, such as guard baulks on bridges, check rails at cross-overs, stiffener brackets on bridges, etc. Experiments made, however, show that oscillations of up to 25 millimetres (31/32 inch) actually occur. The guard baulk of a bridge, which was only 35 millimetres (1 3/8 inches) above rail-level, and hence still 15 millimetres (19/52 inch) from the boundary of the loading gauge, was found to bear slipper marks. Similar observations were made at other places. It follows that as at present constructed the slippers are liable to strike objects and become broken.

During the trials morever, difficulties arose in the connection between the treadles and the distant signals. During the snowfalls of 16, 17 and 24 November of last year the treadles could not be moved into position. The consequence was that the indications of the signals became uncertain and dangerous. In order to make the operation of the signals possible, it became necessary to disconnect the treadles. It seems at the very least very doubtful whether it is possible to improve the treadles in such a way that they will always act reliably, even under unfavorable conditions in winter. For this reason the experiments are to be continued in a modified form; instead of using movable treadles, having a position dependent on that of the distant signal, fixed treadles or bars are to be tried. The locomotive driver is then informed not how the distant signal is set, but only that he is approaching such a signal, just as in the case of the electric apparatus described above. Experiments with this arrangement have not yet been made.

The proposal to use wireless telegraphy for transmitting signals to the locomotive has also been taken into consideration. The Stettin directorate has made trials of this kind on the Angermünde-Neukünkendorf section. The installation was provided by the firm C. Lorenz of Berlin; electromagnetic waves which were continually produced at a sending station were transmitted by induction to the telegraph lines along the track, and from them to a receiver placed on the locomotive. At those places where an approach to a signal was to be indicated, the waves going to the receiver on the locomotives were intercepted by a screen. This brought a wave-detector back to the zero position and a colored disk was shown. The experiments have shown that it is possible, within certain limits, to transmit signals to the locomotive; the strength of the waves, however, became materially reduced as the distance between the sending station and the locomotive increased. Then also the effect which the screen at the distant signal was intended to produce, was also produced in another way, for instance by telegraph lines crossing the railway, by iron bridges, by iron signal poles, and even when the locomotive ran through a deeper cutting. It is as yet hardly likely that this apparatus will give useful results.

On the other hand, good results were obtained with another device tried, the so-called recording alarm. This apparatus is intended to record the over-running of signals. A rail contact is placed next the home or block signal. If this is run over while the signal is at "danger," a recording alarm is set ringing at the place from which the signal is operated. In stopping the alarm a counter is advanced one, and thus records the overrunning of the signal. This makes it possible forthwith to investigate every case of overrunning. If a signal is overrun at all frequently, the cause can be investigated and any existing unfavorable conditions can be remedied. This apparatus has been tried by five different directorates, and in each case were good results obtained. A larger number of these recording alarms has accordingly already been ordered.

Thus the number of experiments made on the Prussian State Railway in order to determine, in actual practice, the utility of the proposed devices, is by no means inconsiderable. Proposals of the most varying kinds have been considered. Probably no other administration has made more systematic and comprehensive experiments in order to solve the problem of the prevention of overrunning; and if, without prejudice, we consider the results of the experiments, we obtain an answer to the question why the administration of the Prussian State Railway has not yet decided on the general introduction of one of the proposed devices. An "absolutely reliable" action can not be demanded of such appliances, and will probably never be expected. But it may with justice be demanded that failures shall be the exception, when that care is exercised in the maintenance of the track appliances and the rolling stock which is to be expected in the proper operation of a railway system of the magnitude of the Prussian State Railway. But this standard has not yet been attained in the case of any of the appliances in question; nor, as may be specially emphasized, has it been attained in the case of the van Braam apparatus. Certainly the method adopted by the Prussian State Railway (practical trial of a large number of different appliances) is the best for finding out which of the appliances in question will satisfy all reasonable requirements. In adopting this procedure, the administration need have no fear that it will lag behind foreign administrations in the utilization of valuable inventions; this is shown by the second report, just published, of the American block signals and train control board, which was instituted in 1907 in order to test block signals, automatic stop signals and signals shown on the locomotive. The work of this board extended over two years, and during this time several hundred inventions were submitted to and examined by them; the result was that at the end of the second year of the period the report applies to, one sole appliance for stopping the trains from the track had been constructed and was ready for being tested in practice. Thus this report shows that the large majority of the railway-signal engineers of the United States considers the question of the automatic rail contacts and signals on the locomotive as not yet sufficiently advanced to consider these appliances as ready for practical service. The same is indeed at present the case in Germany.

PREVENTION OF RAILROAD ACCIDENTS

By A. M. Schoyer,
Gen. Supt. Pennsylvania Lines West of Pittsburg.

SPEECH BEFORE ANNUAL CONVENTION OF RAILROAD MEN,
INDIANAPOLIS, INDIANA,
NOVEMBER 9, 1910.

In discussing this question, the speaker does not pretend to be an expert, nor does he expect to exploit the railroad with which he is connected.

The subject, as a whole, is one of the utmost importance to the public, to the Government and to the railroads. Its importance is more apparent as the traffic of the country increases, and it is to the credit of the Railroad Commission of Indiana that they have set aside this Annual Conference for its consideration.

The scientist tells us today that the battle with disease is three-quarters won when its direct cause is discovered. After the germ is located, its destruction is inevitable. The same thing must be true with a matter of this kind. To prevent railroad accidents, they must be analyzed until the main cause has been located, and the efforts of the doctors must be applied to the destruction of that cause.

The consideration of railroad accidents naturally divides the subject into four parts:

1. Accidents due to travelers on the highway.
2. Accidents to trespassers.
3. Accidents to employes in shops and along the railroad in the handling of material and tools, or in the conduct of the average every-day employment.
4. Accidents to passengers and employes growing out of collisions, derailments, and the performance of essentially railroad services required of the average train and yard men, including engine crews.

In studying the Accident Bulletin of the Railroad Commission of Indiana for the calendar year 1909, you will note that there were 147 persons killed or injured on highway crossings in the State of Indiana, resulting in 45 deaths and two serious personal injuries. Of these accidents, 17 resulted from horses becoming frightened.

It is somewhat difficult to locate the germ for accidents to travelers on the highway, or so-called crossing accidents. It is not the speed of trains, for many of the accidents happen to slow-going trains rather than to fast ones. It is not because of the fact that there are no watchmen on the crossings or safety gates, for a considerable percentage of the accidents occur at crossings equipped with watchmen or safety gates. It cannot be said to be the failure of the railroad man to give warning of the approach of trains, for in most cases it is found that the enginemen have given the signal in the way prescribed by law. It is true that in isolated cases these accidents are partly due to the failure of warning signals or appliances, yet in many cases the warning has been properly given. Undoubtedly, therefore, this class of accident must be largely due to carelessness on the part of the public, assisted, occasionally, by similar carelessness on the part of crossing men or other railroad employes.

Our attention is often called to the fact that in Europe there are but few accidents of this kind, and the fact is proclaimed that there are no grade crossings on the railroads there. It was the privilege of the speaker to be in Great Britain in 1906, and again in 1909, at which time conditions surrounding the railroads were looked into rather carefully. As a matter of fact, there are a large number of grade crossings in Great Britain, both of single track and of double track railroads, and the same is said to be true on the Continent.

In England the traveler on the highway, in his vehicle, approaches a crossing at grade. He finds the way barricaded by substantial gates. There may be no train in sight—and usually there is not—but the vehicle stops and waits until the gate-keeper, usually advanced in years and in a greater or less state of decrepitude, comes out of the house, carefully looks up and down the line, unlocks the gate and lets the patient traveler by. It will make no difference to the gate-keeper that another vehicle is in sight approaching the crossing. The gates are again closed and locked, the gate-keeper again enters his house, and when the next traveler approaches, the same procedure is gone through with. If a passenger train be due, whether in sight or not, the gates usually remain down until the train passes, which occasionally is discomforting when the train is late and the crossing watchman or watchwoman, as the case may be, has not been notified.

American travelers would not stand such procedure for a minute. They demand that the gates be up and the crossing open at all times, except when trains are passing. In Great Britain and on the Continent, the gates are down and the crossing is closed at all times except when a vehicle or a traveler is passing.

The railroads of this country are spending vast sums for grade separation. Millions are being poured out annually in an effort to make these crossings safe. On the Pennsylvania Lines alone, there have been some twenty million dollars spent within the past twenty years, and separations contemplating as much more are either in progress or must be arranged for in the near future. There is no commensurate return on this in the way of dollars and cents—no railroad can show any appreciable interest on such an investment; but the communities and the states, very properly, are enacting laws which are requiring that the crossings shall be separated, and where this is not the case, the larger railroad companies themselves are, as fast as they can afford to do so, separating the grades in order to preserve the life and limb of the public.

A suggestion is offered with regard to this matter which, if carried out, will greatly reduce the number of accidents to travelers on the highway, and that is that it should be a misdemeanor, under the law, for any traveler or driver of a vehicle to cross over the tracks of a steam railroad at grade without having first come to a full stop and taken careful observation in both directions. If there was such a penalty attached to the violation of this law and the law were enforced, accidents at grade crossings would be few and far between. This might slightly slow up the speed of automobiles, but I do not know that that would be such an unfortunate thing for the general good.

With regard to the second class of accidents—accidents to trespassers—I note that in the calendar year 1909 there were 167 persons killed, 33 seriously injured and 153 slightly injured, by the steam railroads in the State of Indiana.

The railroad companies are absolutely unable to prevent this class of accident. No amount of care on their part, no amount of supervision, can stop the trespassing nor prevent the trespasser from being hurt. The germ in this class of accidents has been discovered. It is "Utter disregard of the life and limb of the citizens by the State and National Government of these United States."

It has been said that if the railroads of this country were to build walls and fences around their tracks, as is done abroad, there would be fewer accidents. That is true. The railroads of Great Britain are surrounded by a splendid and impenetrable wall; that wall is the law of the land. It is a misdemeanor to walk on the railroad tracks in Great Britain—a misdemeanor that is punishable by fine or imprisonment, and the law is enforced. There is little or no trespassing on any of the railroads there. What is the situation in this country? There is practically no law against trespassing on the railroad tracks, and such little law as exists is almost utterly ignored by the local magistrates and police officery. If a railroad company attempts to arrest persons found on their right of way in violation of law, where there is a slender thread of law, their representatives are abused in many cases and the persons set free immediately.

In a large city in a neighboring state, a number of men and women were injured, and several killed, while trespassing on the railroad, in the vicinity of a large classification yard where coal was received. The poor, unfortunate people were endeavoring to augment their winter's supply of fuel from the coal which fell from cars along the right of way. Warnings were unavailing, removal by force merely resulted in the immediate return of the trespassers or of their relatives, and so it was determined to arrest a few of these persons found in the yards and have them arraigned for stealing coal. What was the result? The prisoners were set free, the railroad company paid the costs, and the police officers of the railroad company were notified that if they brought any more persons before the magistrate on that charge, they would be imprisoned themselves.

Therefore, gentlemen, the remedy for trespassing lies in proper laws properly enforced, and until the Railroad Commissions of these great states cause laws to be passed which will make trespassing on the railroad a misdemeanor, punishable by fine or imprisonment, and see that such laws are enforced after they are passed, they cannot hold themselves guiltless in the matter of the great slaughter of human beings which is yearly taking place among the trespassers.

In the third class of accidents—accidents to employes in shops and along the railroad in the handling of material and tools, or in the conduct of the average every-day employment: In the calendar year 1909, there were more of these cases than of any other class of accidents—52 cases due to working with machinery or tools, 16 cases due to defective machinery or tools, and 600 miscellaneous cases. It cannot be determined, from the reports of the Railroad Commission of Indiana, how many of these cases were fatal, but it is presumed that there were but few fatal cases. There were, undoubtedly, a number of serious accidents. However, the great majority of these accidents are more negligible in their character or not of a serious nature; but they can hardly be considered as accidents due to railroad operation. Similar accidents are occurring in manufacturing establishments and in all establishments where human labor is required. The germ in this class of accidents is undoubtedly carelessness of the individual, of his fellow workman, of his foreman or of some of the employes of the railroad company. There were 16 cases classified as resulting from defective tools and machinery, and a number of the other cases may have been due to this cause.

Eternal vigilance is the price of safety, and this is especially true in the case of men working around machinery or working where material is being lifted, loaded or unloaded. Unfortunately, many of the laborers employed by the railroad companies are ignorant of the language of the country, and many of the acts of carelessness of these men are caused by ignorance.

It is believed that accidents of this nature can, in many cases, be prevented, first, by having interpreters where foreign laborers are employed who can talk to them and show them the dangers; second, by a more thorough course of education of the green men employed; and third, by better supervision. In other words, if we tell the men what we expect, how to take care of themselves, how to do the work and then see that they do it, undoubtedly, we will greatly reduce this very prolific cause of accident.

The railroad statistics of foreign lands may or may not take account of accidents of this character; but they should not be so included in any land, or if included, there should be such ample explanation that the public may understand that most of them are accidents such as occur in all branches of employment, are often of a minor nature, and a considerable percentage are accidents entirely divorced from the man's employment, such as walking home, falling down steps, etc.

And now as to the fourth cause—accidents growing out of collisions, derailments and the performance of the extraordinary services required of the average train and yard men, including engine crews; in other words, accidents to the passenger and accidents to the employe—what we ordinarily term "train accidents." Probably, when the Commission assigned this subject to the speaker, they really expected him to talk only on this latter subject.

During the calendar year 1909, there was one passenger killed on the railroads in the State of Indiana, 6 seriously injured and 249 who suffered lighter injuries. There were 81 employes killed, 50 seriously injured, and 1144 slightly injured. Of the employes killed or injured, 1255 in all, 668 were accounted for in the third class of accidents, leaving about 588 employes and 256 passengers killed and injured in this class of railroad accidents. For your information, the cases of accidents are given, as follows:

Coupling cars	52
Collisions	196
Derailments	134
Getting on or off trains in motion	152
Falling off cars at rest	166
Injured by overhead obstructions	7
Injured by side obstructions	31
Passengers injured miscellaneously	66
Defective platforms and stations	3
Total persons killed or injured	807

The causes of the principal collisions, as shown by the Interstate Commerce Commission bulletins for the last three years, show that out of 253 such collisions, 67% were due to the negligence or failure to observe the rules on the part of train and yard men, including engine crews, and 23% grew out of the negligence or failure of other employes to observe the rules. There were some derailments caused by broken rails, others by defective equipment, and there may have been accidents caused by defective rules; but generally speaking, the large number of accidents occurring in this category is due to the negligence of the employe or his failure to observe the rules; *that* is the germ.

It is generally thought by American students, and you will see it so stated from time to time in American newspapers, that there were no accidents, or negligibly so, on foreign railroads. During several weeks' time spent in Great Britain in 1906, there was not one day when the speaker did not find a report of at least one railroad accident in the morning newspapers; and during a shorter period spent in Great Britain in 1909, there was not a day when the speaker did not find a record of at least one railroad accident in the morning newspapers.

On August 2nd of this year there appeared an open letter in the London "Times," in which Eustace Balfour was complaining about the serious conditions of affairs on one of the English railroads. He says, " * * * The signal which was intended to arrest a following express had been put down, and I was locked in. There were, in the carriage, ladies of various shapes and sizes to be helped through the windows. The single guard (that is, brakeman or conductor in this country), with his one key, hurried painfully and slowly from door to door. Is this mismanagement?" He says further: "I can clearly recall two accidents in which the passengers in a portion of a train could have escaped, while those in another portion could not. In one of these the collision was with a truck of mineral oil. Those who could not escape were burned."

This is quoted simply to show you that the real facts in connection with travel abroad, are that there are accidents, and many of them, and that life and limb is also endangered there on the railroads. It must be so. The practices in effect on many of these British roads would not be permitted in this country for an instant. What railroad manager here would permit a passenger train to set off its rear sleeper or coach at an intermediate station on the fly? Yet, that has been a common practice in Great Britain—the front part of a train shooting by the station at a speed of 50 or 60 miles an hour, while a minute or two later the detached coach or sleeper, in charge of a guard, is dropped off safely onto a siding close by—when it is stopped in time. There have always been accidents growing out of this practice and most of the better roads in England are now stopping it.

Is there any railroad manager in Indiana who would permit the air on his passenger trains to be so arranged that if the train broke in two, neither portion of the train would stop? Yet, that is largely the practice in England, where, in many cases, the vacuum brake is used. Very few, if any, freight trains are equipped with air brakes of any kind.

Bear in mind that there is no flagman on British trains. When a train stops, absolute dependence is placed on the signals behind it. Bear in mind that there is no pilot on British engines; there is but a step in front. They rely on the gates and the law to keep obstructions away from the track. Bear in mind that there is no headlight used on British railroads to illuminate the railroad. Where a light is used, it is behind a small lens—something like a marker light with us—and is simply for the purpose of advising signalmen and other employes of the approach of a train. It is, undoubtedly, necessary for American railroads to have headlights; otherwise, how would the faithful trespasser know that the train was approaching? Eliminate trespassing, and, undoubtedly, the powerful headlight could be done away with.

There are many other practices in connection with the British railways which would not and could not be tolerated in this country. It is not denied that there are fewer people hurt and killed on British railways than there are on the railroads in this country. But the accidents which are occurring there and the reports which are issued, would have to be closely investigated to determine this exactly. It would appear that there should be a careful study made of this subject by the body which compiles these statistics in this country, and if this were done, very useful facts might be determined which would either assist in reducing the number of accidents or would make us more satisfied with what our American railroads are accomplishing. One thing is certain: The conditions are absolutely dissimilar. There is no great volume of freight traffic in Great Britain, nor is there any such shifting of employment as in this country. It cannot be said that their discipline is better than ours, because we know that practices are tolerated among their employes which would not be tolerated here. The fact remains that we have accidents and that we have many of them. The British workman may be more careful and painstaking to the smallest detail.

While considering British accidents, we should not forget to study our own. One railroad known to the speaker has been and is studying the causes of these distressing casualties, and although no appreciable reduction in their number is as yet apparent, such a study by the roads must, in time, bring effective results.

The State of Indiana is to be congratulated at the small number of fatal accidents to passengers during the past year. The matter of train accidents is being closely watched in this state by your able Commission, and with their close attention to the subject, the public can look for still better results in the future.

The carelessness of the employe is a matter with which we have to deal. What causes it? How can it be prevented? I desire to speak very plainly.

Take one of the smaller causes of accident, the so-called boiler explosions. Every year in this broad land scores of men practically commit suicide or manslaughter because they will not obey the rules which prohibit dependence on the water glass or because they forget the matter of water for the boiler, or because they recklessly take the chances. Only one thing can kill this germ—require absolute obedience to the rules.

Then take the matter of train rules. The train rules of the steam railroad companies are very uniform. They are based on the train rules and block rules of the American Railway Association. They are the result of years of study by experienced men, and while they may not be perfect, they are as nearly perfect as care, experience and constant consideration can make them. Yet, collisions of all kinds occur under these rules constantly. Has the germ been located? Then why is it not destroyed?

The railroad companies are increasingly careful as to safety appliances, partly due to the stringent National and State laws and partly to their own initiative; but from whatever cause, the fact remains that safety appliances on cars and switches, stations and shops, are more carefully looked after and more uniform in character than ever before. The railroad companies are adopting block systems almost universally. Especially is this the case in Indiana, where the law requires it and where the Commission sees that the law is enforced. Some railroad companies are adopting expensive lock-and-block systems—what is known as the manual-controlled block. Others are adopting the almost equally expensive automatic block system, which so greatly facilitates the movement of vast volumes of passengers and freight. There is, however, a simple block system which is, in the judgment of the speaker, applicable to most railroads having heavy traffic in the state and which is less expensive, namely, the single track block system as outlined in the rules of the American Railway Association. These rules are so clear, so easily understood and so readily enforced, that they can be put into effect anywhere with splendid results; and on railroads having but a light traffic, the old system of spacing trains can be followed with reasonably safe results; so that every railroad in the state can thus adopt a block system suited to the needs of its traffic. There is a mistaken idea that the most expensive systems must be used everywhere. Certainly, this commission will help the railroads to work out the least expensive system suited to its traffic needs.

The matter of more powerful headlights is being exploited in many places. This matter can only be briefly touched on here. Let us hope that haste will be made slowly in this direction. Grave dangers accompany a brighter light, and the passageway between Scylla and Charybdis is a narrow one. So long as colored lights are used at night and enginemen must judge distances and depend on warnings given, anything which would tend towards false visual impressions should only be accepted after the most exhaustive study.

Another "Ounce of Prevention" can be used by the railroad companies in their original choice of men. There are times in railroad history when the pressure of business is felt and the need of additional men to handle the business is burdensome, when railroad officers feel inclined to let down the bars and employ all applicants. When this is done, it is followed, sooner or later, with accidents which, if carefully investigated, could clearly be shown to result from the railroad. The pressure of organization is undoubtedly felt by many railroads in this matter, thus limiting their choice of men, but it seems to the speaker to be essential to the safety of railroad operations that the choice of men for railroad service should be unrestricted and that the greatest care should be exercised by the railroad companies, who are also responsible to the public. After these men are employed, they must be educated carefully and painstakingly, they must be shown how to perform their duties, and they must be trained in the rules and regulations of the company and examined in them; and then, the right men having been chosen and educated, after thorough and proper examination, the great work of discipline commences; and this is where the railroad company must again use the greatest care.

It can be said, without fear of successful contradiction, that the tendency of the time is away from discipline. The railroad organizations of the men are usually called "Brotherhoods." Being brothers, they feel that they must stand by each other, and feeling that they must stand by each other, the effort of the organization is to see that its members retain their positions, or having been discharged or suffering severe penalties for violation of rules or neglect of duty, that they be reinstated or that the penalty be lightened. The quarterly and annual reports of many of the leading Brotherhoods of railroad organizations contain long lists of men who have been reinstated in their positions or whose penalties have been lightened by reason of the efforts of the Brotherhood. In the judgment of the speaker, one of the greatest causes of accidents in this country today is the interference with discipline on the part of organizations or of others. Every time a man who is responsible for an accident has had his sentence shortened or returned to duty after being discharged, by reason of the interference of his brother employes or his organization, or of others, it is inevitable that other accidents of a similar nature will occur—not by the action of that employe, but through the negligence of others who will be led to feel that they can successfully neglect the rules or their duty and be relieved from the results by the strength of the organization or friends behind them.

Now, do not think for a minute that the speaker is not in favor of organizations. He believes that the railroad organizations have done great things for the morals of the men, the character of the men employed on the railroad has been improved by them. Without organization, probably, many injustices would have taken place in the way or conditions, which do not now exist. But when an organization attempts to interfere in the matter of discipline or attempts to cause the railroad companies to review their disciplinary action, carefully taken after accident or infraction of rule, then they are interfering with the safety of the public and of their fellow employes; and such interference should not be tolerated. It cannot be tolerated if we expect to make life and travel on the railroad as safe as it should be, and the organization and the employe should join with the management in stamping out such interference at all times.

This same argument relates to the interference of the politician. Perhaps the man who is responsible for the accident is a good worker for the party or for the individual office holder, or perhaps has sufficient influence to even cause the Honorable Railroad Commissioners to ask that his case be reviewed. Gentlemen, I believe that organization, politics, fraternal societies and religion must be absolutely divorced from railroad discipline if we would destroy the accident germ.

What shall I say to the railroad men with regard to the prevention of railroad accidents? It is certain that they must properly conserve their manhood or they cannot preserve the lives of those entrusted to their care. It is certain that they must do their work with care, since they are engaged in a dangerous calling at the best. It is certain that if they desire to help in the prevention of accidents, they must obey the rules of the railroad company, laid down for their own protection, at all times, and that they must obey the law of the land at all times.

Many of the accidents among railroad men grow out of the employment of new men, who are insecure in step or who are not thoroughly conversant with their new duties, or who are not entirely familiar with the rules. The experienced railroad men can go a great way toward the prevention of accidents by helping to educate these new men. It isn't a pleasant thing to do. No doubt. all men would rather work with men who are experienced; yet the older employes should remember that they were new men themselves at one time and that it is only through them that these new men can safely learn their duties and help make the railroad life a safe one for others.

As long as there are railroads, there will be accidents. As long as there are railroads, there will be opportunities for accidents. But the future records of the Railroad Commission of the State of Indiana will, in proportion to the density of the traffic, record more and more accidents, or fewer and fewer accidents, as the Railroad Companies and the railroad men remember that absolute obedience to rule, absolute attention to duty, and eternal vigilance are the three elements which mean safety to the public and to the railroad employe. Anything which breaks down these three barriers will increase deaths and the maimed and the injured in this great state.

A MONUMENTAL PASSENGER STATION

BRIEF DESCRIPTION OF THE NEW YORK STATION AND TUNNELS OF THE PENNSYLVANIA RAILROAD, OPENED FOR TRAFFIC IN SEPTEMBER, 1910.

Of first importance in railway accomplishment during the year 1910 was the opening for traffic of the monumental station of the Pennsylvania system in the very heart of Manhattan Island. Covering eight acres of what was formerly residence and business property with a building of noble architectural beauty, it crowns with success an undertaking abounding in engineering and financial difficulties. Situated in the blocks bounded by Thirty-first and Thirty-third streets on the South and North, and by Seventh and Eighth avenues on the East and West, its eight acres of masonry, structural iron and Italian marble actually form a bridge dome over the entrances to two sets of tunnels. The premier of these bores under the North (Hudson) river. What may be considered the secondary set pierces the backbone of Manhattan, passes under the East river and comes to the surface on Long Island.

But the station, whose classic proportions appeal to the eye and whose conveniences mark the latest attempt to meet the demands of modern passenger travel, occupies less than one-third of the property necessary to carry out the far-sighted designs of its projectors and construction. Between Eighth and Tenth avenues to the West, four blocks have been obtained and excavated to afford space for storage of cars and for the two tunnel tracks that emerge from the Tenth avenue portal to spread out into the twenty-one tracks that enter beneath the station. To the East the number of tracks decreases from twenty-one to four for the main line. These last pass under the city and East river to the Sunnyside yard on Long Island, the terminus of the tunnel extension and the point of connection with the Long Island Railroad.

All told the station and yards have an area of twenty-eight acres, in which there are sixteen miles of track. The storage tracks will hold 386 cars. The length of the twenty-one standing tracks in the station is 21,500 feet. Between these tracks are eleven passenger platforms, with twenty-five baggage and express elevators. The highest point of these tracks is nine feet below the sea level.

The western tunnel extension of this great terminal begins at Harrison, New Jersey, a short distance East of Newark and 8.6

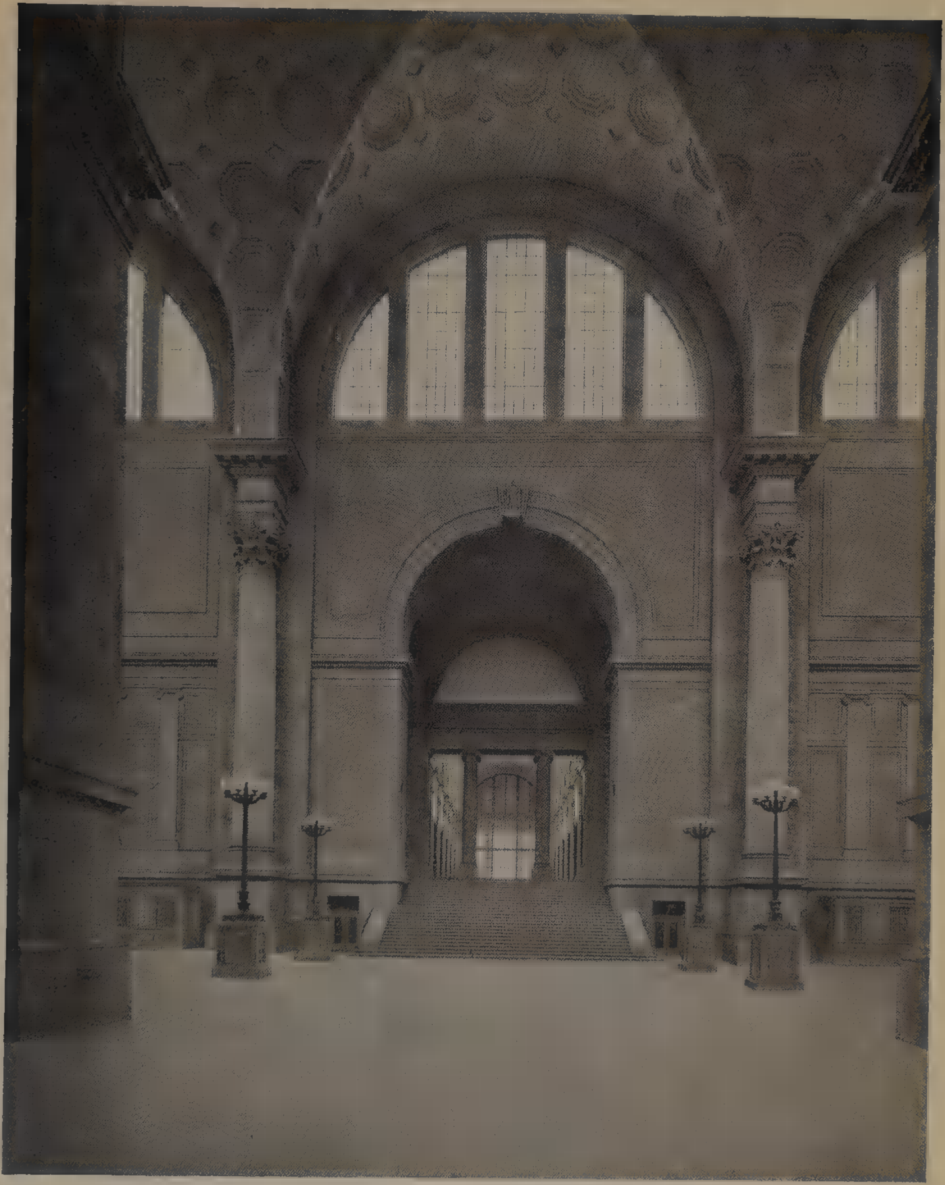
miles from the station in Manhattan. Here through passenger trains from Southern and Western points change from steam to electric power and pass over a double track elevated line on embankments and bridges across the Hackensack Meadows to the Bergen Hill portals to the tunnel under the Hudson. They emerge at Tenth avenue, New York, after attaining a maximum depth of 97 feet below mean high water.

The tunnels or tubes themselves consist of a series of iron rings and the installation of each ring meant an advance of two and a half feet. Eleven segments and a key piece at the top complete the circumference. An entire ring weighed about fifteen tons. The record progress in one day of eight hours was five of these rings, or twelve and one-half feet. Hydraulic rams, placed against the flanges every few inches around the tube, were used to push forward the huge shields with which the tunnels were bored. This type of shield weighed 194 tons. It had nine doors in it, and through these came rock, or sand, or silt, or whatever material the tube penetrated. The engineering exactness with which this work was performed was demonstrated when on September 17, 1906, the shields under the Hudson met without the variation of a fraction of an inch.

When the tubes were through, the work of lining them with 22 inches of concrete was begun. On each side of the tunnel there is a so-called bench three feet wide which serves as a walk, under which are carried conduits for telegraph, telephone, signal and power wires.

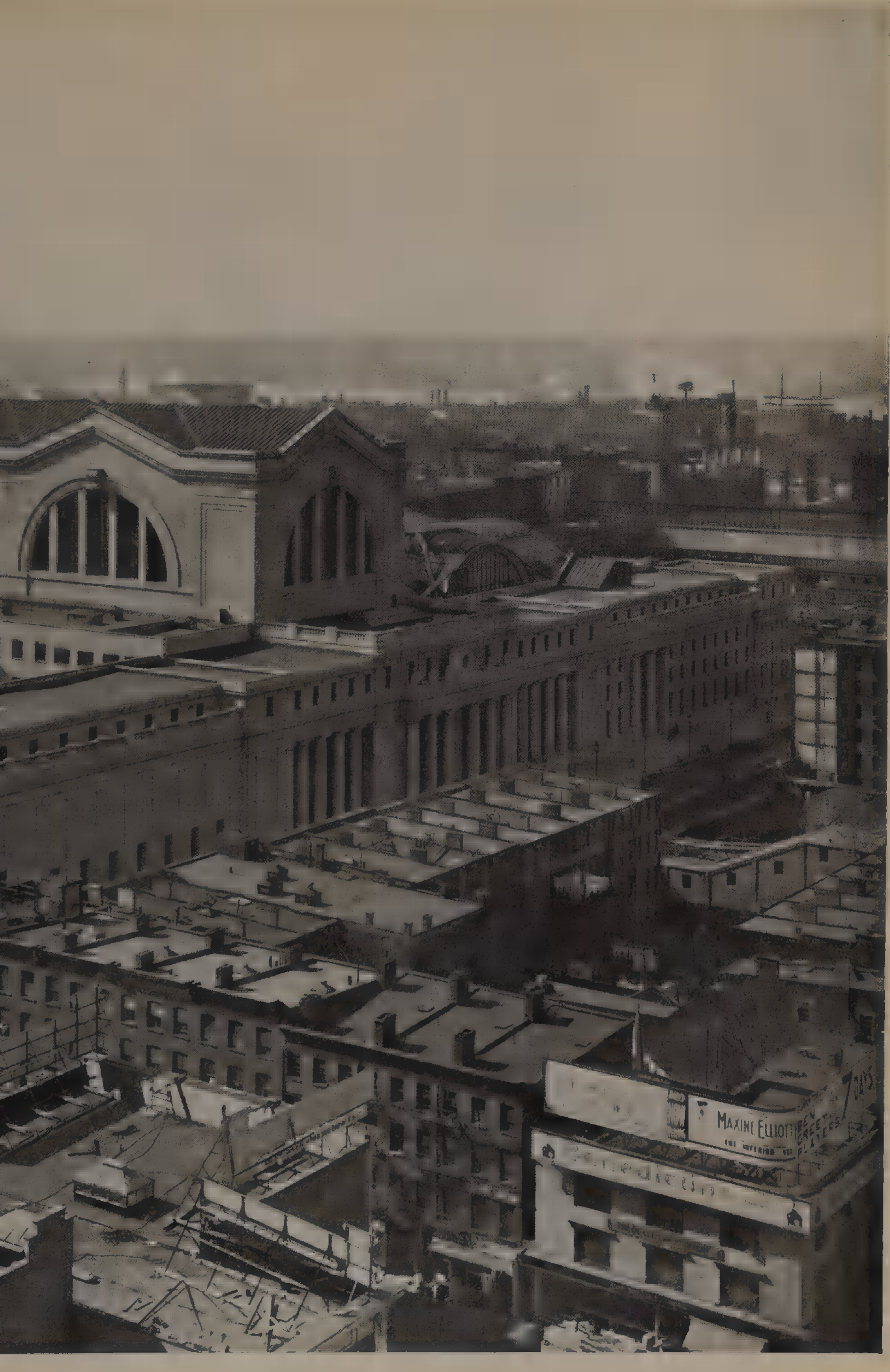
As for the station proper, its vast proportions and imposing architectural features entitle it to be classed with the truly great buildings of the world. The Vatican, the Tuileries and the Winter Palace at St. Petersburg are larger, but no man who saw the laying of their foundations lived to see their completion. The Pennsylvania station was erected in less than six years and the great undertaking of which it is the culmination was completed in less than nine years from the grant of the franchise by the city of New York.

Built after the Roman Doric style of architecture, the station building has a frontage of 784 feet on the streets and 430 feet on the avenues. The average height above the street is 69 feet, with a maximum of 153 to the top of the dome over the main waiting room.

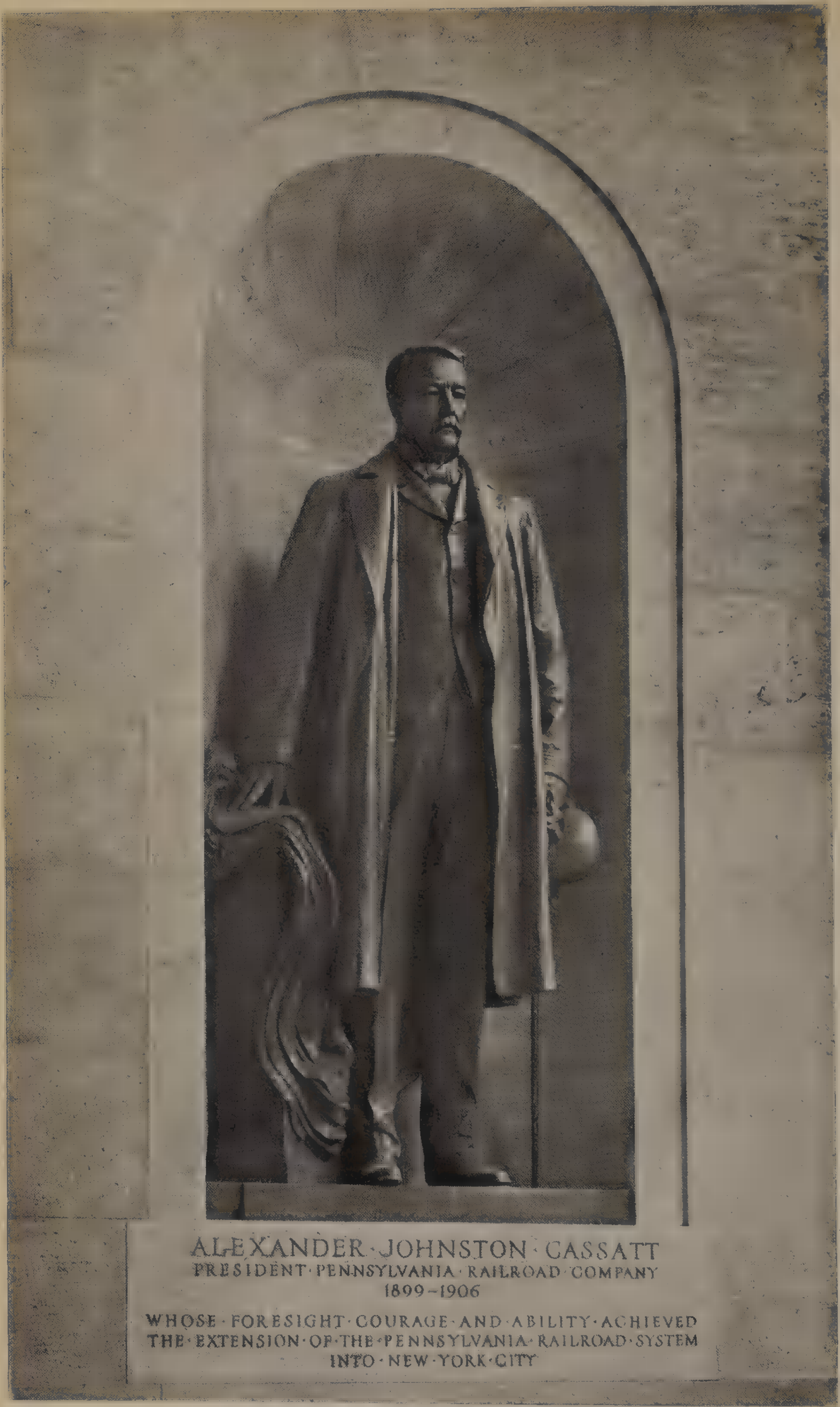


Pennsylvania Station—

View of Main Waiting Room, looking from Entrance to Concourse toward Seventh Avenue, showing Grand Stairway



*Pennsylvania Station—
Bird's-eye View*


ALEXANDER · JOHNSTON · CASSATT
PRESIDENT · PENNSYLVANIA · RAILROAD · COMPANY
1899 – 1906
WHOSE · FORESIGHT · COURAGE · AND · ABILITY · ACHIEVED
THE · EXTENSION · OF · THE · PENNSYLVANIA · RAILROAD · SYSTEM
INTO · NEW · YORK · CITY

Statue in Pennsylvania Station

The Seventh avenue facade, which faces the reader in the accompanying illustration, is intended for the main entrance. As will be seen, the Doric colonnade of which it is composed is doubled at the carriage entrances, at the corners and at the main entrance for pedestrians at the center. Each of the columns is 35 feet high with a diameter of four feet six inches.

The central entrance on Seventh avenue leads to the main waiting room through an arcade 225 feet long by 45 feet wide, flanked on both sides by shops. At the west end of the arcade are the restaurants, lunch room and cafe, and beyond are the general waiting room and concourse, the latter on the first level below the street. In front of the entrance to the station on Thirty-third street, midway in the block, a wide private street has been cut through to give direct communication with Thirty-fourth street, which is one of the important crosstown thoroughfares of the city.

One of the many noteworthy features of this station is the waiting room, which extends from Thirty-first to Thirty-third streets. its wall parallel to Seventh and Eighth avenues for over 314 feet. It is 109 feet wide and gets a height of 150 feet by reason of its walls rising above the main body of the building. As seen in the bird's-eye view illustration, each side of these walls contains three semi-circular windows with a diameter at the base of 66 feet 8 inches. The end walls have similar windows.

Parallel to and connecting with the main waiting room by a wide thoroughfare is the concourse, a covered assembling place over 200 feet wide, extending the entire width of the station and under Thirty-first and Thirty-second streets. It is directly over the tracks on which the trains arrive and depart and forms the vestibule to them from which stairs descend to each of the train platforms. All of its area is open to the tracks, forming a courtyard 340 feet by 210 roofed by a dome of iron and glass.

Below the main concourse and eighteen feet above the train platforms is the exit concourse to be used for egress purposes only. It is connected with each train platform by one elevator and two stairways, and a moving stairway leads from it to the north entrance of the station.

By means of this exit concourse provision has been made for the complete separation of incoming and outgoing traffic above the train platform level. It is designed that traffic may enter or leave the building on any of the four adjoining streets and avenues, thereby avoiding congestion.

The main baggage room, with 450 feet of frontage, is located on the same level as the general waiting room under the space occupied by the arcade and restaurants on the plane above. Baggage is delivered to and taken from trains through a special subway. From the baggage room trunks are delivered to the tracks below by motor trucks and elevators. Motor cabs also will be stationed on this level.

The eleven passenger platforms are on the third level, some 36 feet below the surface of the street. Here the English practice of a platform raised to the floor of the cars has been adopted.

The northern side of the station, extending along Thirty-third street, has been assigned to the Long Island Railroad with separate entrances, exits, ticket offices, etc., so that its large suburban traffic can be handled independently.

The maximum capacity of all the tunnels running into this station has been placed at 144 trains per hour and the initial daily service consists of about 600 Long Island and 400 Pennsylvania trains daily.

When the new station of the New York Central is completed, New York will be able to boast the two railway stations whose cost, magnitude and modern conveniences surpass those of any other city. In architectural beauty and impressiveness the Pennsylvania station is without a peer in industrial buildings and takes high rank with the classic structures devoted to art, religion and government.

According to the last annual report of the Pennsylvania Railroad Company ''The total cost of this extension to December 31, 1910, including real estate not permanently required for its use and conservatively estimated to be worth between seven and eight million dollars, and not yet disposed of, is $112,965,415.52, of which $47,400,000 has been charged against net income and profit and loss, and as explained in previous reports, $10,000,000 has been borne by the Pennsylvania Company and charged against its profit and loss account.

[NOTE: As this issue of *The Railway Library* goes to press another colossal passenger station in Chicago, occupying three city blocks, has been completed for the Chicago & Northwestern Railway Company to meet the public demand for costly but unremunerative modern requirements and conveniences. A description of their latest tribute to the insatiable "Spirit of Progress" will appear in the *Library* for 1911.]

EDWARD HENRY HARRIMAN

By Otto H. Kahn.

An Address Delivered Before the Finance Forum in New York on January 25, 1911.

Mr. Harriman had reached the age of nearly fifty years without attracting any general attention. In later life, when in reminiscent moods, he used to say that the fact that he had been born and bred in New York, and had done his work right here in the midst of people many of whom had known him a great number of years, had militated considerably against his recognition. He thought if he had "blown" into New York from the West, his rise would have been a good deal more rapid. It was the old story of the prophet having little honor in his own country. Even after he had started on his course of achievements in the Union Pacific Railroad those of us who then began to speak about the man's marvellous capacities, used to be met frequently with remarks such as: "Ned Harriman! Why, I knew him years ago as a little 'two dollar broker.' What should he know about practical railroading? How could he suddenly be developing these wonderful qualities you speak of? You can't make me believe that a man can have lived in this community for nearly fifty years, have been known to lots of people, have made a fairly succcessful career, and then all of a sudden turn out to be a genius."

It was in 1894 that I first met Mr. Harriman, who was then in his forty-seventh year, but my first vivid impression of Mr. Harriman dates back to a hot summer afternoon in 1897, when, looking pale, weary, and tired out, he came to my firm's office to induce us to take an interest with him in a certain business. We did not particularly care for it, and told him that we preferred not to join in the transaction. He argued to convince us of its merits, and, finally, not having made any headway, he desisted. I thought he had accepted our declination. He got up to go, but turned around at the door and said: "I am dead tired this afternoon, and no good any more. I have been on this job uninterruptedly all day, taking no time even for luncheon. I'll tackle you again to-morrow, when I am fresh. I'm bound to convince you, and to get you to come along." He did. He came again the next day, and finally we yielded to the sheer persistency of the man, and to the lucidity of his arguments. It is worth mentioning, by the way, that his judgment was right; the business turned out very well.

The incident has impressed itself upon my mind because though of small importance in itself it was so characteristic of the man. There was first of all the correct judgment as to the merits of a proposition and as to its outcome—a judgment marvellously clear and sure, almost infallible. There was, secondly, the iron determination—so conspicuously in contrast to his frail appearance—the dogged persistency in pursuing and carrying out his purpose. He did not know the meaning of the word "defeat."

He positively loved obstacles, and the harder to surmount, the more they allured him. Difficulties, risks, dangers were not only no deterrents, but rather inducements to undertake a task. When there was an easy way to accomplish a thing, and also a difficult way, Mr. Harriman's inclination would be to take the latter.

Over and over again did I observe him bending men and events to his determination, by the exercise of the truly wonderful powers of his brain and will; powers which accomplished their fullest potentialities because they were united with unwavering loyalty under all circumstances and with a sacred respect for any commitment entered into. A moral obligation, to him, had the same force and meaning as a legal contract.

POSSESSED THE NECESSARY INGREDIENTS OF GENIUS.

Not infrequently he would come to meetings at which ten or twelve men sat around the table with him,—men, too, of no mean standing in the business community,—a large majority of whom were opposed to the measures he would propose. Yet, I know of hardly an instance of any importance where his views did not prevail finally, and, what is more, generally by unanimous vote. If he did not succeed in what he had set himself to achieve at the first attempt, or the second, or the third attempt, he would retreat for a while, but he never gave up; he moved on towards the attainment of his object, undismayed, resourceful, relentless as fate, with that supreme patience which, according to Disraeli, is "a necessary ingredient of genius." When Mr. Ryan bought the control of the Equitable Life Assurance Society, Mr. Harriman claimed to share in the purchase. Mr. Ryan refused positively and publicly. For five years nothing more was heard of the matter, and even Mr. Harriman's intimate associates thought he had dropped the idea. Only a short while ago it became known that a year before his death Mr. Harriman had finally succeeded in his object, having purchased from Mr. Ryan one-half of his holdings.

A high placed personage temporarily residing in Japan during the year 1905 told me that the most amazing thing he had ever witnessed was the way in which Mr. Harriman in the course of a ten days' visit to Tokio made a whirlwind campaign among the leading men and succeeded in carrying away from the wily, wary, slow-moving Orientals a most important contract—so important and so far-reaching that, had it been carried out (and it was no fault of Mr. Harriman's that it was not), the course of Far Eastern diplomacy in recent years would have been different in some essential aspects. I was asked sometimes, when things that had seemed utterly improbable of realization were finally accomplished by Mr. Harriman, to give a reason why the parties concerned had yielded to him. What was the inducement? What was the motive for their action? Why had they done finally what they had declared they would not do, or what there was no plausible explanation for their doing? My answer was: "Simply because Mr. Harriman had set his will and mind to work to make them do it." He once said to me, early in our acquaintance: "All the opportunity I ask is to be one amongst fifteen men in a board room." Yet he had neither eloquence nor what is ordinarily called tact or attractiveness. His were not the ways or the gifts of the "easy boss." Smooth diplomacy, the talent of leading men almost without their knowing that they are being led, skillful achievement by winning compromise were not his methods. His genius was the genius of a Bismarck, or a Roman Caesar, his dominion was based on an iron will combined with tenacity of purpose, indomitable courage, tireless toil, marvelous ability, foresight almost prophetic, and, last but not least, upon those qualities of character which command men's trust and confidence. His rule was frankly the rule of the conqueror who has made his place by the superiority of his powers. He was constitutionally unable either to cajole or dissemble. He was stiffnecked to a fault. It would have saved him much opposition, many enemies, many misunderstandings, if he had possessed the gift of suavity. Sometimes, when some of his associates would chafe under his undisguised autocracy, I ventured to plead with him that the results he sought could just as surely be obtained by less combative, more gentle methods. His answer was invariably: "You may be right that these things could be so accomplished, but not *by me*. I can work only in my own way. I cannot make myself different, nor act in a way foreign to me. They will have to take me as I am, or drop me."

To a man so constituted, the world did not yield its rewards easily and willingly. The way to the heights of power leads always through the valleys of envy, jealousy and animosity; but in Mr. Harriman's case the opposition, the enemities, the hatreds, which disputed and contested his progress were bitter, violent and numerous, far beyond ordinary measure. Yet, by the irresistible force of his genius, he acquired in the brief space of ten years a position in the railroad world such as no man had held before him, and no man, probably, will hold again. Though he was lacking in the faculty of attracting men in general (I say "in general," because upon those who came close to him the spell of his personality was most potent), he did have the gift in a most marvellous degree of attracting power as the magnet attracts iron. At the time of his death, the papers were full of comments as to the vastness of the territory in which his influence was potent or controlling; but the most remarkable thing, to my mind, was not the extent of his power, but the fact that his commanding position, his control over so many undertakings, rested not on money, but on personality.

I do not think that the greater part of his fortune was invested in railroad stocks, and, if every cent of it had been invested, it would have amounted to but a small fraction of the share capital of the properties in which his influence was predominant. He became gradually the centre of railroad power, and at the same time one of the greatest powers in finance, because his masterful ability, his constructive genius, the farsightedness and correctness of his vision, his faithfulness to trust reposed in him, impressed themselves finally alike upon friend and foe.

Found His Opportunity in Union Pacific.

This was Mr. Harriman's situation from the spring of 1908 to the time of his lamented, untimely death in September, 1909, less than twelve years after his great opportunity had come to him in his election to the Board of the Union Pacific Railroad. Contrary to the general impression, he had had nothing to do with the financial reorganization of that property consummated in 1897. That measure—after years of receivership during which the system had become dismembered through the secession of its most important branches, feeders and outlets until nothing was left of the old Union Pacific System but the bare trunk stem, after infinite delays, complications and difficulties—was finally accomplished by a Committee consisting of Messrs. Louis Fitzgerald, Jacob H. Schiff, T. Jefferson Coolidge, Jr., Chauncey M. Depew, Marvin Hughitt and Oliver Ames, with Mr. Winslow S. Pierce as counsel, and Messrs. Kuhn, Loeb & Company as financial managers. After the property had been acquired by the Reorganization Committee at foreclosure sale, Mr. Harriman was elected a member of the First Board of Directors in December, 1897, in compliance with a promise which Mr. Jacob H. Schiff had made to him in the course of the reorganization proceedings.

Almost all of the members of the Board had been previously connected with the Union Pacific, either through old affiliations or through membership in the Reorganization Committee. Mr. Harriman was a newcomer, and by several members of the Board his advent was not regarded with friendly eyes. He was looked at askance, somewhat in the light of an intruder; his ways and manners jarred upon several of his new colleagues, and he was considered by some as not quite belonging in their class, from the point of view of position, financial standing, and achievements; a free lance, neither a railroad man nor a banker nor a merchant. Within one short year he had placed himself at the head of the board, and became the ruling spirit, the dominating force of the enterprise. If you ask me how this amazing transformation was accomplished, I can only refer you to other examples which history records of the phenomenal rise of those exceptional beings whom Providence has endowed with such qualities as to compel the acceptance of their leadership by their contemporaries. The story of the rise and development of the Union Pacific under Mr. Harriman's magic guidance; the metamorphosis by which the rather pathetic object which emerged from the receivership, stripped of its outlets and most important branches, ending rather helplessly at the borders of the Great Salt Lake, was turned in an incredibly short space of time into the magnificent system of today; the startling, almost uncanny rapidity with which Mr. Harriman assimilated and mastered all the intricate details, problems, difficulties of railroading, and from having been all his life a financial man (except for a very short term as vice president of the Illinois Central in Chicago) became an acknowledged master in that science; the boldness and accuracy of his conceptions and visions, the daring of his strategy, the dramatic incidents which accompanied his conquering career—all this has been so fully and frequently told in newspapers and magazines that I need not weary your patience by repeating it here. I will only point to the fact that in the first fiscal year following Mr. Harriman's election to the Union Pacific Board the surplus earnings of the system applicable to $107,000,000 of common stock were $5,800,000. To-day, taking the figures of the last fiscal year, the surplus earnings of the Union Pacific system (excluding the Southern Pacific) applicable to $216,000,000 of common stock, are $41,500,000. From the time Mr. Harriman assumed the direction of affairs to the time of his death $127,000,000 were spent in improving the property, for three-quarters of which sum (to be exact, $94,000,000) not one dollar of capitalization was created. The free assets held absolutely unincumbered in its treasury have an aggregate value of $210,000,000.

It is essential to remember, in contemplating these truly astounding results, that they were achieved, not only with no increased burden to the public, but that on the contrary the shippers and others using the lines of the Union Pacific system were benefited alike with the stockholders. Indeed, whenever there was a question between increased returns to the stockholder and increased efficiency to the railroad Mr. Harriman invariably chose the latter course. As a matter of fact, he cared altogether more for the approbation of the people served by the lines of his railroad than for the applause of the financial or any other part of the community.

I have sometimes heard it said that the remarkable accomplishments indicated by the figures above quoted were due mainly to the unprecedented growth in wealth and prosperity of the territory served by the Union Pacific system, and not to Mr. Harriman; that the country made the Union Pacific and would have made the Union Pacific, Harriman or no Harriman. There is just a sufficient modicum of truth in this assertion to deserve contradiction. That the growth and prosperity of its territory were indispensable to the growth and prosperity of the Union Pacific goes without saying; but this growth and prosperity during the past decade were universal throughout the country west of the Missouri River, and their benefits were available to all other Western railroads to the same extent as to the Union Pacific. Here is a characteristic instance of how he started his campaign of efficiency: Immediately after he had succeeded in having himself elected chairman of the executive committee, in 1898, and while the superior office of chairman of the board (later on occupied by him) was still held by another (Mr. Winslow S. Pierce), he started on a tour of inspection of the property, going over every inch of the line, taking the measure of the officials in charge, interviewing shippers, establishing his authority with the surprised and somewhat reluctant personnel of the organization in the West, who had hardly heard his name before, and did not quite know what to make of, and how to act towards, the nervous, rapid-fire, little man who came in like a whirlwind, sweeping fresh currents of air into all sorts of dusty nooks and corners. After a few weeks he telegraphed to the board in New York asking for authority to purchase immediately a large quantity of cars, locomotives, rails, etc., and to start various works of improvement, the total aggregating, as I remember, something like $25,000,000, which telegram was followed by a written communication setting forth the reasons for his requests and the main details of the proposed expenditure. The reasons, in short, were that he clearly discovered signs of returning prosperity after the long period of depression, that he believed this prosperity would assume proportions corresponding to the depths and extent of the long drawn out and drastic re-action which preceded it, that labor and materials were then exceedingly cheap, but would begin to advance before very long, that the Union Pacific should put itself in shape to take care of the largely increased traffic which he foresaw, and to attract business to its lines by being better prepared for it, and thus afford shippers better facilities than its neighbors. Remember that at that time the Union Pacific had but just emerged from receivership, that during the years of the receivership all of its surplus earnings had been spent on increasing its rolling stock, improving its physical condition, etc., so that it was supposed to be amply supplied with facilities to handle its then existing volume of traffic, that $25,000,000 in those days was a vastly greater sum than nowadays, when the stupendous development of the country has made railroad expenditure of proportionate size familiar, and that it seemed a pretty hazardous thing to venture upon this huge outlay simply on a guess of coming unprecented prosperity. There was much doubt in the board as to whether Mr. Harriman's recommendation should be followed. I remember that the statement was made that if it were followed the Union Pacific would find itself in receiver's hands again before two years had passed. The subject was laid over until Mr. Harriman's return to New York. He came home, and after long and strenuous argument he carried the day. The appropriation for the expenditure advocated by him was made, though with considerable headshaking and misgiving, and it was this courageous outlay at a time when the dawn of the unexampled prosperity which was to come was barely discernible, and the intelligent and efficient application of the funds, that started the new Union Pacific on its amazingly successful career and placed it, with one bound, in the forefront amongst western railroads. Incidentally I may mention, as characteristic of the man, that Mr. Harriman felt so certain of the correctness of his judgment, and of his ability to carry the board with him (though he had no illusions as to the sentiment of some of its members regarding him and of the fatal consequences to his career in case his forecast should turn out to have been mistaken or even premature) that, while he was still in the West, and so as to be sure not to lose time or opportunity, he took upon himself the responsibility, at his personal risk, of concluding various contracts for purchases and work included in the program advocated by him.

Some months before, he had caused his associates to wonder and doubt, by buying all of the Union Pacific common stock he could accumulate, up to the price of 25 or thereabouts. He must have acquired many thousands of shares, for the stock had long been selling freely between 15 and 20, it was considered to have but little intrinsic value, and there were no dividends in sight even for the preferred, much less for the common stock. I recollect an influential financial personage saying to me about these purchases, which at the time attracted a good deal of comment: "You see, the man is essentially a speculator. He is putting everything he has and more into Union Pacific common and preferred at these prices. He will come to grief yet." When I referred to the subject of these purchases in conversation with Mr. Harriman, he said calmly: "Union Pacific common is intrinsically worth as much as St. Paul. With good management it will get there." It seemed the wildest kind of wild talk, and even though at that time I had already conceived great admiration for him and great faith in him, I did not take it seriously. Union Pacific, just emerged from wreck and ruin; St. Paul, an old seasoned dividend payer that had passed with ease through the panics and devastations of the preceding years, and was even then selling above par! Within less than ten years from the time Mr. Harriman had made what then appeared a preposterous prediction, Union Pacific had been placed upon an annual dividend basis of 10%, was selling in the market at close to 200, and had left the price of St. Paul far behind.

Those of you who are familiar with Wall Street events will know that in August, 1906, the Union Pacific dividend was jumped from an annual rate of 6% to 10%, which act unchained a storm of criticism against Mr. Harriman. He was accused of having perpetrated a stock jobbing trick, as the property, it was thought, could not possibly maintain that rate of dividend, and of having bought stock on his advance knowledge, immediately preceding the declaration of the increased dividend, so as to profit, at the expense of other holders, who had no knowledge of what was contemplated, from the rise in the market which was bound to follow. Both accusations were unjustified. No property for the management of which Mr. Harriman was responsible ever reduced its dividend, and the Union Pacific has maintained with ease a distribution of 10% per annum, derived to the extent of 6% from the earnings of the railroad, and to the extent of 4% from its investment holdings. Anybody who knew anything of Mr. Harriman's methods knew that his acts were not the results of sudden impulse, but of plans long prepared and determined on; that he had gone on record at every opportunity as advising owners of Union Pacific stock to retain their holdings, and that if he wanted to increase his own holdings he would do so (as, in fact, he invariably did) in times of depression and not wait to rush in a few days or weeks before the advent of some favorable consummation. At one of the hearings at which he was examined, he was asked whether it was not a fact that he had bought Union Pacific stock in anticipation of the 10% dividend declaration, the meaning of the question being of course the accusation that he had unfairly taken advantage of his advance knowledge of the contemplated increase. To every one's surprise Mr. Harriman calmly answered "Yes." The examiner turned towards the audience with a triumphant smile and continued: "Mr. Harriman, as you have been thus frank, would you mind telling me approximately when and at what prices you bought that stock which you have just admitted you acquired in anticipation of the increased dividend?" Mr. Harriman smiled faintly in his turn as he answered slowly:—"Certainly, I shall be glad to tell you. Let me think back a minute. I bought most of that stock, many thousand shares of it, in anticipation of the 10% dividend declared August, 1906, some eight years before, mainly in 1898, and I paid all the way from 20 to 30 for it. And I bought more of it in subsequent years, whenever prices were low, many thousand shares more; and all the time while I was accumulating it I anticipated the declaration of that dividend."

STRANGER TO THE ART OF MAKING FRIENDS.

In telling this story, I do not wish to be understood as endorsing the wisdom and propriety of the increase of the Union Pacific dividend from 6% to 10% *at one jump.* It was one of the few instances in which I ventured to differ from Mr. Harriman's judgment. A man, and especially a man at the head of a great corporation, must not only *do* right, but he must be very careful to avoid even appearances tending to arouse the suspicions of his not doing right, and the fact and manner of that particular act lent themselves to sinister interpretations, unjustified though, as a matter of fact, they were. But regard for appearances was not one of Mr. Harriman's strong points. He was a master of what Whistler called "the gentle art of making enemies." His manner was brusque; he was short tempered, though he had his temper under perfect control, and never lost it whatever the provocation—in fact the greater the strain the more perfect his calm and self-possession. He had infinite patience in working out plans, in biding his time, but very little in intercourse with men. His mind worked so rapidly, his thoughts crowded upon him at such a rate, that his words could not come anywhere near keeping pace with the working of his brain.

The third reason for the widespread and long-continued popular misconception in respect to Mr. Harriman's motives, character and methods, arose from the fact that he failed to recognize, as indeed most financiers of his day failed to recognize, that a man holding the power and occupying the conspicuous place he did was a legitimate object for public scrutiny, and that if opportunity for such scrutiny was denied, if the people were met instead with silence or resentment of their desire for information, the public mind very naturally became infected with suspicion and lent a willing ear to all sorts of gossip and rumors. Tennyson wrote of the "fierce light that beats upon a throne," and the public insist very properly and justly upon the same fierce light beating upon those in dominant places of finance and commerce. The temptation to the arbitrary and selfish exercise of great power is so strong that the burden of proof that they can be safely trusted with its possession is nowadays rightly laid upon those in high positions. It is for them to show cause why they should be considered fit persons to enjoy the people's confidence, not merely for their ability, but just as much, if not more for their character.

Mr. Harriman was a man who might have adopted as his motto the exhortation of the most heroic figure of the French Revolution, Danton—"*De l'audace, encore de l'audace, et toujours de l'audace.*" "Daring, again daring, and ever daring."

His Attitude to the Law.

Mr. Harriman's attitude in respect to the law of the land has been much misinterpreted and misunderstood. To begin with, he had profound respect for the moral, the ethical law, and under no circumstances and under no temptation would he ever have done anything which was not justified before the tribunal of his own conscience, his own honest conception of right and wrong. But he chafed and fretted strenuously when the letter of some statute, possibly drawn without a full realization of its practical effects, stood in the way of what he considered to be absolutely proper and beneficial objects to accomplish. He was irritable and impatient at stupid laws, as he was at all stupidity. He had to be shown to his entire conviction that the law did clearly stand in the way before he would desist from a purpose which he deemed just and right, but the realization of which would not have been in accordance with existng statutes. If there were substantial doubt he would be tempted to resolve the doubt in favor of his purpose and go ahead; whenever possible, he would be a law unto himself, but he never consciously went counter to any existing law (except, to be entirely correct, that he may have winked at the infraction of one or two provisions of the railroad law which for many years, with the full knowledge and sanction of the constituted authorities, had lain dormant, and for lack of enforcement had come to be looked upon as unenforceable and as obsolete as the old Puritan blue laws).

Nevertheless, somehow or other, true to his fatal gift of getting into trouble, he managed to become the storm-centre around which the agitation for reform in railroad laws raged most violently. He was held up to execration as the arch-type of law-defying corporation managers, he was singled out as a horrible example, especially in connection with the Chicago and Alton re-adjustment, for which, by the way, he was only partly responsible, but for which he, characteristically, took upon himself the full responsibility as soon as it was attacked, as he realized that the attack, though nominally directed against that re-adjustment, was really directed against himself personally.

The land was set ringing with denunciations of him, and particularly in Europe, where I had occasion to spend a few months during that year, 1907, he was made the text for violent tirades against the iniquity and lawlessness of American business methods in general and of Harriman methods in particular. These unmeasured criticisms gave me the opportunity for some straight talk in the countries of their origin by way of explanation and correction. No gambling frenzy has occurred in America within the memory of this generation equalling the recklessness and magnitude of England's South African mining craze with its record of questionable episodes, some of them involving great names; no scandal comparable to the Panama scandal, the copper collapse, the Cronier failure, and some similar events in France; no bank failure as disgraceful and ruinous as that of the Leipziger Bank and two or three others within the last dozen years in Germany; no trusts exist here approaching some of the so-called cartels and syndicates of Europe in completeness and thouroughness of monopolistic control. I have had experience of financial business in all the leading commercial centres, and I have no hesitation in asserting that the financial community of this country is second to none, and superior to some, in Europe in its standard of honesty and honor—all the more to its credit, as in Europe justice strikes swiftly and sharply, while here the law's delays and complicated machinery throw undue safeguards, amounting in certain ways almost to a measure of toleration around the malefactor.

Mr. Harriman was an intensely patriotic man, proud of his country, its institutions, and its achievements, jealous of his own honor and of America's fair fame abroad, always willing and eager to do his full duty as a citizen as he saw it, and he resented deeply, and so did his friends, the efforts of his detractors to represent him as a lawbreaker, and his phenomenal success as due, at least in part, to his having managed to evade or set at nought the laws of his country.

I have spoken of Mr. Harriman's love for a fight, but—lest this be misunderstood—I should add that, like every truly brave and strong man, he never picked a quarrel. On the contrary, he looked upon war as waste, and he abhorred waste as a cardinal economic sin. One of the characteristics of the old methods of railroad management was for each company to seek by every means, and not infrequently by underhand and unfair practices, to advance its own interests at the expense of the others and there existed among the different companies a constant state of warfare or armed neutrality. The true interests of all of them, and often the interests of the public, were sacrificed for the purpose of obtaining some supposed advantage to one company at the expense of another. Mr. Harriman was foremost amongst those who advocated and worked for the more enlightened policy of "live and let live," of fair and frank dealing and legitimate co-operation among railroad managers in the interests both of the railroads and of the public.

MR. HARRIMAN AND NORTHERN PACIFIC.

It would require a volume to tell the tale of all the contests in which he was involved, and highly interesting and dramatic it would be. The most spectacular episode of this kind in his career was the contest for the control of the Northern Pacific Railroad. It was entered into, not, as has been somewhat widely believed, from ambition, from lust of power or aggrandizement, but in defence of what he considered vital interests of the property for which he was chiefly responsible and which he held to be gravely menaced by certain acts of other railroad interests. For the resulting unfortunate "corner" in the market no blame whatever attaches to him, and more than one of the incidents connected with the entire episode entitle him to high credit, as will become plainly apparent when the true and full story of the case is published, as it will be some day. When the smoke of the battle cleared away, the Harriman side was found in possession of a majority of the entire capital stock of the Northern Pacific, counting common and preferred together, whilst their opponents held a majority of the common stock alone, by a small margin, but not of the entire capital stock. By the provision of its charter the company had stipulated for the right to pay off its preferred stock at par; needless to say, so important and essential a clause had not escaped the attention of Mr. Harriman and his associates, it had not only received their most careful attention before they decided to accumulate the preferred stock, but had been submitted by them to five leading lawyers in different parts of the country, who, acting and reporting separately, agreed unanimously in their answer to the question regarding which they were asked to advise. On the strength of these legal opinions and of other circumstances, Mr. Harriman was convinced at the time and ever afterwards that he held, beyond any question of doubt, the winning hand.

Instead of boldly playing it, he contented himself with a drawn battle and with the terms of peace, which gave to the other side the appearance of victory.

Mr. Harriman, as is well known, left an exceedingly large fortune, yet the wealth which he amassed was but a small fraction of the wealth which his constructive genius created. The vast bulk of his fortune he made by backing the country, in general, and the enterprises to which he mainly devoted his genius, in particular.

His Greatest Single Achievement.

His real purpose, to which—as I said before—money-making was merely incidental, was to do big constructive things, his real sport was to pit his strength and brain against those of other men or against difficult tasks, his real reward was the consciousness of worthy accomplishment, the sense of mastery, the exercise of power. An English admirer returning to New York after a trip over the Union Pacific system said to him in offering him his congratulations on the condition of the property: "The one single piece of actual railroading of which I should think you must be proudest and which must be most gratifying to you is the complete success of your wonderful bridge over the Great Salt Lake, for the feasibility and the undertaking of which you took the full responsibility in the face of many fruitless attempts in former years, and in the face of almost universal disbelief in its practicability as a durable thing.'' Mr. Harriman replied: ''No, the best single thing we did and which gave me most satisfaction was this: The Colorado River was flowing over, threatening thousands of irrigated acres in the Imperial Valley, which would have meant destruction to the lands and ruin to many settlers. The situation became more and more serious, the Government's efforts to control the river proved unavailing, and finally President Roosevelt telegraphed me to ask whether the forces of men and engineers we had could and would undertake the work of saving the situation. I wired our representative and asked him how long it would take to dam the flood and change the course of the river and what the expense of the undertaking would be. He reported that it would take such and such a time, that it would be a race between us and the flood, with our having a margin for safety provided he took every man within reach from all other jobs and put him on this one, and provided he was allowed to proceed regardless of cost. He estimated the total expense at a somewhat startling figure, and added that most of it would be lost if we did not finish in time. I gave direction to suspend all other work, and to give this job the right of way over everything else, regardless of disturbance of traffic or of expense, and I telegraphed President Roosevelt that we could and would undertake the task of saving the Imperial Valley. And then we started on the race with the elements, and I used every ounce of driving power I possessed to hustle the job as I have never hustled any job before. We beat the flood and averted untold loss and suffering. That was the best single bit of work done on my authority and responsibility.

An incident similarly worth recording as characteristic of the man was his action at the time of the San Francisco earthquake and conflagration. When the news of that catastrophe reached New York he not only wired directions, without a moment's loss of time, to set all other traffic and work on the Union and Southern Pacific lines aside, and to concentrate all of the energy and facilities of these organizations upon the task of rushing relief and affording assistance to the stricken city, irrespective of cost to the railroads, but he hurried, himself, to San Francisco, the very next morning, without giving thought to personal risk and discomfort, and his presence, counsel and co-operation were of no little advantage to that community in its magnificent struggle to recover from destruction and chaos.

That Mr. Harriman was a man of vast ambition, ever restlessly striving forward and onward, reaching one goal only immediately to set out for another, goes without saying. He planned for a generation ahead, always having himself in mind as the man who would carry the plans to realization, giving no room to the thought that he might no longer be there to do so—again a trait of which history records many instances in the cases of men pre-eminent in creative work. When I saw him in Munich, a few weeks before his death, and we exchanged reminiscences anent the achievements of the last ten years, he said to me: "There is more before us in the next ten years than we have accomplished in the last ten." Yet, at the time, the shadow of death was hovering over him, he was pitiably and pathetically weak and frail, he could hardly stand up without support—but his spirit and courage were as dauntless, his brain, will and faith in himself as strong as ever, he fought the powers of nature, he defied the physical deterioration which was rapidly breaking him up with the same indomitable pluck, the same dogged refusal to get beaten, as he had stood up against difficulties and tribulations all his life.

I once heard Mr. C. P. Huntington, president and creator of the Southern Pacific Railway, say, speaking of the art of managing a great property: "Watch the details. Then the whole organization will watch the details. That is the main thing. Big matters will always receive attention and will naturally come up to you anyhow." And I have heard another eminently successful man speaking on the same subject: "Don't waste your strength on non-essentials. Never do yourself what you can hire some one to do equally well for you. Keep your head and time free for the big things, for those things which must emanate from the commander-in-chief and which cannot be delegated." Mr. Harriman's method was a middle course between these two doctrines, with a strong leaning, however, toward Mr. Hungtinton's theory.

THE HARRIMAN EXTERMINATION LEAGUE.

The crisis in Mr. Harriman's career came early in the year 1907. A few of his bitterest enemies had set out the year before on a carefully planned, astutely prepared, campaign of destruction against him. To their banners flocked a number of those whom in his conquering course he had met and vanquished, some of whom by his rough domineering ways he had unknowingly offended, others who were simply envious and jealous, certain politicians whose ill-will he had incurred, many who in perfect honesty and without any axes to grind but basing their opinion mainly on hearsay saw in his personality, his methods, his ambition and his growing power a real menace and danger to the public good and, lastly, a few who had reason to throw public opinion off the scent and to detract vigilance and search from themselves by concentrating it on another. This is not the place nor has the time yet come to describe the true inwardness of this remarkable episode which has in it all the elements and ingredients of melodramatic romance. The Harriman Extermination League—if I may so call it—played its trump-card by poisoning President Roosevelt's mind against Mr. Harriman, with whom he used to be on friendly terms, by gross misrepresentations, which caused him to see in Mr. Harriman, the embodiment of everything which his own moral sense most abhorred and the archetype of a class whose exposure and destruction he looked upon as a patriotic duty. With Mr. Roosevelt leading the attack, the League felt so certain of their ability to hurl Mr. Harriman into outer darkness, defeat and disgrace, that they actually sent considerate warning to his close associates to draw away from him whilst there was yet time to do so, lest they be struck by fragments of the bomb which would soon explode under Mr. Harriman, and which was certain to hurl him to destruction. Mr. Harriman, of course, was fully aware of all this. He braced himself against the coming blow, but did nothing to avert it, let alone run away from it.

In February, 1907, the assault commenced with an investigation by the Interstate Commerce Commission into the practices, etc., of the Union Pacific Railroad, actually into those of Mr. Harriman himself. His enemies had planned better than they knew. Whether long continued, nerve racking, physical suffering had for once affected his otherwise so unfailing judgment (he told me later on that during the year 1906 there was not a day in which he was not tormented by severe pain), whether the contemplation of the Union Pacific's dazzling prosperity overcame temporarily the hitherto so potent sobriety of his brain (he had just amazed the financial world by placing the concern on a 10% basis of dividends and by realizing for it a profit of $60,000,000 on the sales of its holdings of Northern Pacific stock), whether for once his vast and restless ambition had broken through his calm reasoning, or whether it was simply an unaccountable solitary error of judgment, such as is found in the career of so many amongst the leaders of men, whatever be the cause or the explanation—he took action in that year which it has always seemed to me, was the one serious mistake of his management of Union Pacific affairs. I refer to the purchase of very large amounts of stock of many other companies, which were made for the account and placed in the treasury of the Union Pacific. For some of these acquisitions, it must be said, there was valid, legitimate and, in fact, almost compelling reason, even at the then prevailing high prices, but for others it was and is difficult to discern sufficient warrant, especially considering the time and the cost at which they were made and the effect which they were likely to have and actually did have on public opinion.

These transactions, first becoming known to the public through the investigation of the Interstate Commerce Commission, which gave them a doubly suspicious appearance (they would, as a matter of course, have been disclosed anyhow in the next annual report of the Union Pacific), lent color to the impression that Mr. Harriman was aiming at a gigantic illegal monopoly of the railroad industry. This, taken together with the simultaneous unfair and hostile presentation of the old Chicago and Alton transaction, added to the latent irritations, enmities and apprehensions which his career and his ways had aroused, and fanned by the skilful and insidious publicity work of the Harriman Extermination League, it unchained a veritable cyclone of criticism, condemnation and defamation upon him. Mr. Harriman, on the witness stand, did nothing to set things right; he always made an indifferent witness, being impatient, resentful and defiant under examination, reluctant to explain so as to make things plain to the ordinary understanding and disdaining to defend himself against accusations or innuendo. An inflamed public sentiment lent ready credence to the allegations, accusations and insinuations which were spread broadcast, in the press, from the platform, in political assemblies, even from some pulpits. A kind of hysteria of fury against him swept the land; he was denounced and anathematized as a horrible example of capitalistic greed and lawbreaking.

Amidst all this terrifying din, amidst this avalanche of vituperation, misrepresentation, threatening and asasult, amidst the desertion of some friends, the lukewarmness of others, amidst the simultaneous strain and stress of a financial panic (during which, moreover, he did more than his full share in the work of support and relief), Mr. Harriman stood firm as a rock, calm, silent and dignified. He did not complain, he asked nobody's help, he made no appeal for sympathy, he told no one that he was weak and ill and that the continuous nervous strain was a fearful tax on his impaired health, he stooped to no weapon not sanctioned by the rules of gentlemanly warfare, though plenty of them lay ready to his hand and though his opponents were troubled by no such scruple, he offered no compromise, no concession, he did not budge an inch, he never for one moment took his hand off the helm—and thus he rode out the storm.

THE CHANGE IN POPULAR SENTIMENT.

The fight lasted for a full year. Gradually the aspect of affairs began to change, gradually the effect of Mr. Harriman's brave and dignified attitude began to tell. One fine morning it became known that in the face of universal discouragement, single-handed, directing matters from a sick bed, he had saved a very important railroad from bankruptcy, by one of those strokes of combined boldness and wisdom which had become familiar to those who knew him best and which, in this instance, marked the end of the 1907 panic. From that time on his star rose rapidly again. The people at last began to recognize that in his great constructive genius they possessed a national asset of no mean value; they also recognized that the man, his motives and purposes had been grievously maligned and misunderstood, and with characteristic impulsiveness and generosity they started to give him plentiful evidence of their change of heart. The Harriman Extermination League broke up. He himself had learned in the bitterness and isolation of that one year that even the strongest cannot afford with impunity to ignore or be lacking in consideration for public opinion, to allow himself, through aloofness, secretiveness or otherwise, to become misunderstood by and estranged from the people. He became mellower and more communicative; his door was no longer closed to the agencies which inform and thereby largely mould public opinion; he no longer resented scrutiny or even legitimate curiosity; he went about to meetings of merchants, shippers and farmers, occasionally making addresses, and proving by his appearance that he had neither claws nor hoofs.

There were no longer any enemies to trouble him. The opportunity was now his, at least, to carry out his great plans of constructive work, without, as heretofore, all of the time having to interrupt himself to guard his rear and flanks against attacks or to dash forward and give battle. But his frail, ill body, which had been kept together—as it were—by sheer force of will as long as the fight was raging, collapsed when the strain and tension was relaxed. In the early summer of 1909 he went abroad in search of health. A few months later he returned home to die.

I have confined this sketch in the main to matters and considerations incidental to Mr. Harriman's business career. I have refrained, amongst other things, from touching on the important and somewhat stormy chapter of his political activities, as I have little firsthand knowledge regarding them, except in connection with certain episodes which are too recent and of too personal a nature to discuss at present.

There is many another episode, many another manifestation of Mr. Harriman's character and spirit that I might and should like to relate but that I must pass over because of the limitations which discretion imposes. However, the picture would be essentially incomplete without making reference to his family life, which was a model of what an American home should be, and where he was ever surrounded by affection, gentleness, devoted care and sympathetic understanding. Nor should mention be omitted of his many acts of kindness and helpfulness, of his ever ready and generous support of charitable enterprises, altruistic efforts and public-spirited undertakings, and in particular of his active interest in the Boys' Club of the City of New York, of which admirable institution he was President for many years, and for the use of which he erected a fine building at the corner of Avenue A and Tenth Street.

It was my privilege to be closely associated with Mr. Harriman, to be honored with his friendship and confidence, to see him almost daily during twelve years, to gain a close insight into the workings of his brain and soul. The better I got to know him, whom but very few knew and many misunderstood, the greater became my admiration for that remarkable man, the deeper my attachment. His career was the embodiment of unfettered individualism. For better or for worse—personally I believe for better unless we go too far and too fast—the people appear determined to put limits and restraints upon the exercise of economic power and overlordship, just as in former days they put limits and restraints upon the absolutism of rulers. Therefore, I believe there will be no successor to Mr. Harriman; there will be no other career like his.

While I was writing this sketch a poem by Rudyard Kipling recently published came to my notice, which struck me as so appropriate, and so singularly descriptive of Mr. Harriman, and withal so fine in thought and language, that I beg leave to quote some of its lines as the closing note to these remarks:

If you can keep your head when all about you
Are losing theirs and blaming it on you;
If you can trust yourself when all men doubt you,
But make allowance for their doubting too;
If you can wait and not be tired by waiting
Or being lied about don't deal in lies,
Or being hated don't give way to hating,
And yet don't look too good, nor talk too wise.
If you can dream—and not make dreams your master;
If you can think—and not make thoughts your aim;
If you can meet with Triumph and Disaster
And treat those two impostors just the same;

* * * * * * * * *

If you can force your heart and nerve and sinew
To serve your turn long after they are gone,
And so hold on when there is nothing in you
Except the will which says to them: "Hold on."

* * * * * * * * *

If you can fill the unforgiving minute
With sixty seconds' worth of distance run,
Yours is the Earth and everything that's in it,
And—which is more—you'll be a Man, my son.

STATISTICS OF AMERICAN RAILWAYS

FOR THE YEAR ENDING JUNE 30

1910

PREPARED BY

SLASON THOMPSON

MANAGER OF THE BUREAU OF RAILWAY NEWS AND STATISTICS

INTRODUCTORY

THE PURPOSE OF RAILWAY STATISTICS.

The year ending June 30, 1910, was one of increased operations, increased exactions, and increased distractions for the railways of the United States.

The year ending December 31, 1910, was one of decreasing revenues, of increasing expenses and of multiplying vicissitudes, due to vexatious regulations and costly requirements.

Regulation, which should be a staff to assist as well as guide, has been used almost wholly as a rod to chastise and a manacle to hobble.

And in the midst of their other tribulations the railways have been called on to adapt their accounts to a new system of statistics.

Into such confusion has the demand for innovations in accounting methods—superimposed on the preparation of elaborate and burdensome monthly and special reports—thrown the returns of the railways that there exists no longer a continuous system of comparable railway statistics in the United States. In the multiplicity of relevant and irrelevant details the essential facts have been minimized and the purposes of publicity obscured.

As much was admitted by the Interstate Commerce Commission when in its report for 1908 it said, "The changes in the income account submitted in the present report are so far-reaching in their results as to impair direct and close comparison with the corresponding statements contained in previous reports." Then fearing it had admitted too much it added, "The mean figures are, of course, comparable."

* * * * * * * *

"The development of railway statistics", says Prof. Henry C. Adams in his First Annual Report on the Statistics of Railways of the United States to the Interstate Commerce Commission for the year ending June 30, 1888, "is largely a matter of education, and demands, *before all else*, that an imperfect model should not receive the sanction of even a single publication."

For twenty-one years, down to and including his twenty-second annual report, the purposes of publicity have been abused, and the case of the railways in the court of public opinion has been prejudiced, by Professor Adams following an imperfect model in the statement of the capitalization and income account of American railways.

The full gravity of Professor Adams' departure from his own dictum is demonstrated and emphasized in the brief filed by Mr. Frank Lyon, attorney for the Interstate Commerce Commission, in the rate hearings recently concluded. In that brief, after presenting a table from the report just mentioned, purporting to give the amount and per cent of capital stock upon which dividends were paid and the amount and rate per cent of dividends paid for the years ending June 30, 1909, to 1888, Mr. Lyon says:

"Thus it appears that in 1888, 38.56 per cent of the stock of railroads paid dividends averaging 5.38 per cent, making a total of $80,238,065, while in 1909 dividends were paid on 64.01 per cent and the rate was increased to 6.53 per cent. Total dividends for 1909 amounted to $321,070,626, an increase of 300 per cent over 1888. The year previous the dividends were $390,695,351, and judging from figures compiled in this investigation the dividend payments for 1910 have been the largest in the history of railroading."

If the attorney for the Commission itself falls a victim to a system of statistics that more than doubles the dividends actually paid out of revenues derived from railroad operations, what chance has the general public to escape the effect of their reiterated publicity*

Owing to the incompleteness of the first annual report, it is not practical to uncover the Ethiopian in Mr. Lyon's statement of the dividend situation in 1888. But the official figures are happily available for 1889 and for 1909, and from these has been prepared the following comparative summary of the income account of the railways of the United States, which disposes of absolutely every red copper derived by them from transportation:

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*NOTE: Since this was written the Commission has rendered its decision on the rate case and Commissioner Lane in his opinion incorporates and adopts the misleading table submitted by Mr. Lyon and adds to it the statement that the "amount paid in dividends" in 1910 was $405,131,650, making an "average rate on dividend paying stock" of 7.47 per cent. The exposure of the fallacy underlying Mr. Lyon's statement is applicable to Commissioner Lane's addition to it, as appears in the body of this report where the transportation revenues for 1910 are discussed. Of the $405,131,650 dividends reported paid in 1910 at least $200,000,000 were declared out of dividends and interest received by the railways.

The decision forbidding an increase in rates was predicated mainly on the mistaken assumption that these dividends came from transportation revenues.

INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED STATES AS COMMON CARRIERS UNDER THE ACT TO REGULATE COMMERCE FOR THE YEARS ENDING JUNE 30, 1909, AND 1889.

Item	1889		1909	
Miles of operated line represented		153,385		232,981
Revenues from operation		$964,816,129		$2,418,677,538
Operating expenses		644,706,701		1,599,443,410
Net revenues		320,109,428		819,234,128
Less taxes		26,738,019		90,529,014
Net income		293,371,409		728,705,114
Deductions:				
Rentals for lease of road	93,953,494		$114,733,212	
Deductions for hire of equipment, joint facilities and other rents	5,403,556		64,632,596	
Interest on funded debt	161,529,341		331,994,861	
Other interest			22,158,417	
Additions and betterments charged to income			24,933,255	
Appropriations to reserves, etc.			20,632,313	
Total		260,886,391		579,084,654
Available for dividends		32,485,018		153,557,429
Dividends	13,206,480		79,308,892	
Surplus from operations	19,278,538		74,248,537	
Disposition of rental by leased lines:				
Interest	51,644,331		51,971,552	
Rentals	2,376,897		3,075,539	
Taxes	852,375			
Miscellaneous charges and reserves	1,392,381		7,296,063	
Dividends	37,687,510		34,617,102	
Credit profit and loss account			17,772,956	
Total	$93,953,494		114,733,212	
Total dividends from operations and rentals		$50,893,990		$113,925,994
Percentage on net capital stock		1.50 %		2.10 %
Total interest on net funded debt		213,173,672		383,966,413
Per cent of interest on net funded debt		5.38 %		4.48 %
Net capital stock	3,403,450,320		5,439,575,947	
Net funded debt	3,963,295,357		8,571,906,436	
Total		7,366,745,677		14,011,482,383
Interest and dividends from operation		264,067,662		497,891,407
Percentage on net capitalization		3.58 %		3.55 %

Here we have the capital and income accounts of the railways reduced to the proper elements with which the act to regulate commerce throughout all its amendments and administration purports to deal—aside from the regulation of traffic, service, safety and rates; and here we are able to judge how utterly delusive and misleading through two decades have been the claims of excessive dividends alleged to have been wrung by exorbitant rates and fares from passengers and shippers.

Instead of paying $80,238,065 dividends in 1889 at the rate of 5.38, the railways only paid $50,893,990 out of transportation revenues, or 1.50% on net capital stock.

Instead of paying $321,071,626 dividends in 1909 at the rate of 6.53%, the railways only paid $113,925,994, out of transportation revenues, or 2.10% on net capital stock. The surplus might be applied to dividends and the aggregate $188,174,531 would still be only 3.46% on net capital stock. But this would leave the railways in the perilous condition of having no working surplus.

Instead of dividends increasing 300%, they have increased less than 125, where railway efficiency has increased over 250%.

As for the fabulous, as well as fictitious, dividends of 1908, represented to be $390,695,351, the report responsible for the statement in a foot note in small type traces $85,284,404 of them to surplus and $162,859,364 to "dividends receivable from railway stock owned or controlled", to say nothing of such portion of them as was declared from the $64,015,142 "clear income from investments" included in the net income from which the dividends were paid. These three items indicate that less than $100,000,000 of the dividends paid by the operating roads in 1908 was derived from transportation and the income account of the leased roads shows that only $33,843,577 was paid by them from current income.

The New York Central and subsidiary companies afford an illuminating example of the duplication of dividends upon which Professor Adams constructs his inflated statistics of "dividends declared".

It is common knowledge that the New York Central owns practically all the stock of the Lake Shore and Michigan Southern and the Michigan Central roads, which, together with other stocks owned in 1909, contributed $7,692,497 to its corporate income. In the same year the Lake Shore received nearly $3,000,000 dividends from stock owned by it and the Michigan Central about $250,000 in dividends from stocks owned. Both these amounts were included in the dividends paid TO the New York Central to be again included in the dividends declared BY it. By this process the $3,250,000 passed into the statistics of the Interstate Commerce Commission three times, whereas the rates and fares from which it was derived were only paid once.

If the balance of the New York Central's income from stocks owned went through only one income account before reaching its treasury, the books of the Commission, as kept, would show over $18,600,000 paid in dividends out of only $7,692,497 received from the public for transportation.

It will not save the face of the table over which Mr. Lyon tripped to say that it relates only to railways *declaring* dividends. Only such duplications as those just described are possible among dividend paying companies; but when the statistics relate to *all the railways* it is not permissible to deal with the traffic of all and calculate the rate of exaggerated dividends only on the fortunate two-thirds that had a surplus, and ignore the remaining one-third which, in the prosperous year of 1909 had no balance whatever available either for surplus or dividends.

Regulation and Statistics.

It is in no spirit of opposition to government regulation of American railways that these comments are made. The writer believes in regulation and supervision through uniform statistics. But regulation to be beneficial for the public as well as the railways must be just, and statistics to be of the fullest value must be candid, simple and continuous.

"Let no man", said Lord Bacon, "weakly conceive that just laws and true policy have any antipathy, for they are like the spirits and sinews, that one moves with the other." In the same essay (Of Judicature) he wrote these memorable words: "Cursed, saith the law, is he that removeth the landmark. The mislayer of a milestone is to blame, but it is the unjust judge that is the capital remover of landmarks when he defineth amiss of lands and property. One foul sentence doth more hurt than many foul examples; for these do but corrupt the stream, the other corrupteth the fountain."

Prior to 1907, the chief changes in the official statistics of the railways of the United States were in the nature of additions and amplification, until in the process of evolution, the reports were recognized as the most admirable and comprehensive official railway statistics in the world. They had their defects, as has been pointed out above in regard to dividends and duplication of capital. Now, however, with the passage of the Hepburn Act of 1906 the spirit of innovation has run amuck among the landmarks of railway statistics. Whole summaries have disappeared, some to give place to others slightly varied and some lost for comparative uses forever. Whole divisions have been dropped, such as "Public Service of Railways," "Earnings and Expenses", and "Summary of Results", which have made way for the divisions of "Selected Statements and Assignments" and "Income and Profit and Loss Statement." The reader can judge from the titles themselves, whether the new divisions are likely to have any advantage over the old. No wonder the Statistician, in his report for 1908, was moved to say, "The changes in the income account submitted are so far-reaching in their results as to impair direct and close comparison with the corresponding statements contained in previous reports."

Prior to 1906 the Commission's statistics included a summary of railway stocks and bonds under the headings:

(1) Amount outstanding.
(2) Owned by Railway Corporations.
(3) Not owned by Railway Corporations.

In a rough way the third heading covered the NET CAPITALIZATION of the railways, or what the official statistician has elsewhere described as, "The amount in the hands of the public which calls for support in dividend and interest payments out of net operating revenues."

Notwithstanding the palpable importance of this item, the column which showed it was omitted in the report for 1906; and since 1907 the entire summary has been dropped and no equivalent printed in its place. In the text of the report for 1909 the amount of capital "in the hands of the public" is stated to be $13,711,867,733, or an average of $59,259 per mile of line, and the only statement of capital owned by railway corporations is that given in the "General Balance Sheet" which includes but 221,679 out of the 235,402 miles covered by the general summaries of the report.

THE OMISSION OF SWITCHING AND TERMINAL STATISTICS.

But these are mere innovations of accounting, and are negligible compared to the exclusion of the returns for switching and terminal companies, which change was initiated in 1908 and made complete in 1909. Previous to the former year, the railway statistics of the United States very properly included all switching and terminal roads reporting to the Interstate Commerce Commission. Since then, with one or two exceptions, every summary has been accompanied with a note saying, "Does not include returns for switching and terminal companies."

The extent of this exclusion is shown in an appendix (a) to the report for 1908, to be 1,910 miles of operated line and 2,295 miles of yard track and sidings, or a total of 4,206 miles of track. The corresponding information is omitted from the text of the report for 1909. In a summary for the press issued by the Commission, the mileage owned by these ostracized companies in 1909 is given as 4,007, of which 1,623 is assigned to main track and 2,384 to yard track and sidings.

However, the extent to which this innovation impairs the value of contemporaneous railway statistics lies, not in the mileage affected, but in the essential nature of that mileage, and the introduction of a distinction between switching and terminal services rendered by independently operated roads and similar services performed directly by the carrier roads "in the day's work", both for themselves and their connections. It is a profitless refinement of accounting that includes the statistics of the switching and terminal work done by the New York Central and Pennsylvania systems directly in New York and excludes that done by the Terminal Company or Association in St. Louis. The one is as much a part of the public service of American railways as the other, and can be reduced to standard or common units just as accurately.

This distinction, introduced by the statistician in 1908, not only impairs direct and close comparison with the corresponding statements contained in previous reports, but vitiates any comparison between the statistics based on the annual reports and those compiled from the monthly reports. What the difference amounts to may be seen in the following summaries drawn from the respective reports for 1909:

For the Year Ending June 30, 1909	According to the Annual Report	According to the Monthly Reports	Excess Monthly over Annual Report
Operating revenues....................	$2,418,677,538	$2,444,694,669	$26,017,130
Operating expenses....................	1,599,443,410	1,616,571,847	17,128,437
Net operating revenue................	$819,234,128	$828,122,821	$8,888,693

It is impossible to reconcile these discrepancies because all the terminal roads excluded from the annual report are not included in the monthly reports—albeit a majority of them are. Moreover, according to the report for 1909, the compensation of the employes of the switching and terminal roads amounted to $17,026,264, or within $102,173 of the difference in the expenses shown in the two reports.

What a difference the exclusion of switching and terminal roads makes in the returns as to employes and their compensation is seen in the following statement:

1909	Excluding S. & T. Roads	Including S. & T. Roads	S. & T. Roads
Number of employes	1,502,823	1,528,808	25,985
Compensation	$988,323,694	$1,005,349,958	$17,026,264

All of which demonstrates Professor Adams' wisdom in 1888 when he remarked that "the development of railway statistics demanded, before all else, that an imperfect model should not receive the sanction of a single publication." This is only another way of saying, "Be sure you're right, then go ahead."

It is peculiarly unfortunate that all railway statistics should be dislocated, so to speak, between the years 1907 and 1908, between the year of their most phenomenal progress and the year of their most signal setback. In the official railway statistics for 1892 and the years following the panic of 1893, the student can trace its effect on the transportation industry, but the annual statistics for 1907, and since, will afford no such record for "direct and close comparison."

The reports of this Bureau will continue to follow, as near as practicable, the divisions and summaries approved by the practice and experience of the Official Statistician prior to the removal of the landmarks in 1907.

THE SPIRIT OF REGULATION.

If there has been any tempering of the hostile spirit of regulation of American railways during the past twelve months, no wireless telegraphy has delivered the message of good will. Congress and the state legislatures continue to broaden the scope of regulation until little is left of the authority vested in the original grantees to construct roads and carry passengers and freight for reasonable charges. And as each new exaction in the matter of service and equipment, as each new restriction on the right to charge reasonable fares and rates for more expensive service is imposed, the railways bow to the rod and murmur:

"Allah is just. Thy servant is a slave, who has no warrant to live except to perform efficient and equal service for a people now numbering 91,972,266 souls."

With the approval of the Mann-Elkins law June 18, 1910, the last vestige of independent initiative in the matter of rates was taken from the railways, and the question of whether they shall be permitted to enter the markets of the world as borrowers, except with the ball and chain of state scrutiny at their heels, is now being investigated by a commission.

Even before the Mann-Elkins bill became a law, the railways were forbidden to advance their rates in order to meet the raids of adverse rulings, that for ten years had been whittling them down to an unremunerative level; and for six months since, they have been standing "on palsied feet" before the Interstate Commerce Commission, whose attorney held a brief against a pitiful raise in rates for which the very ties on 240,000 miles of line cried out.

The prevailing spirit of railway regulation, as now known in the United States, was exemplified in the appearance in the rate hearings before the Commission at Chicago and Washington of an attorney who represented a shippers' association, and was at the same time a candidate for railway commissioner in the great state of Iowa. While playing these dual roles he presented to the Commission a grossly inaccurate statement of the valuations of railways in several states and persisted in offering it after its errors had been exposed and after he had been elected to the office for which he was a candidate.

In which connection it may be instructive to recall the following words of Chairman Cooley in the third annual report of the Commission (1889):

"There is also in the public mind a sense of incongruity between the prosecuting function, involving as it does detective methods and an attitude of hostility, and the judicial function, rightly expected to require impartial and just investigation and decision of controverted questions of law and fact. It is a fundamental principle, and generally provided for by statutes, that every man shall have a fair trial before a tribunal free from any possible bias that might arise from relationship, interest in the result, or partisan connection as attorney or counsel, or who may become a prosecutor in the transaction."

Whatever may be the conclusion in the rate hearing there can be no question that in vesting it with power to suspend rate advances until their reasonableness has been investigated and ascertained, Congress has armed the Commission with power over the railways, for weal or woe, which it is inconceivable that any commission sitting in Washington or any other city can exercise with either sufficient knowledge or wisdom. Such a task is simply superhuman.

* * * * * * * *

During the year 1910 the process of cutting down railway rates throughout the country has proceeded with unabated consistency.

Where an analysis showed that out of 357 decisions rendered by the Commission in 1909, 61% involved rate reductions or reparation, and none an advance, a similar analysis for 1910 shows 198 decisions out of 336, or 58.9%, granting reparation or reduced rates to complainants without a single advance. The opinions accompanying these decisions, as distributed among the Commissioners, were written by the following members:

Opinion by	Dismissing Complaints	Granting Reductions or Reparation
Chairman Knapp	21	37
Commissioner Clements	19	24
" Prouty	25	34
" Cockrell	21	20
" Lane	20	32
" Clark	21	26
" Harlan	11	25
Total	138	198
Per cent	41.1	58.9

Coincident with the judicial process of rate reduction shown in this table, the Commission between January 1st and December 31, 1910, entered no less than 3,103 informal reparation orders or unreported opinions, granting reductions or refunds involving amounts all the way from 25 cents to $11,606. One issue of the *Traffic World*, the weekly that publishes these orders regularly, contained no less than 257 separate orders, involving amounts from 67 cents, refund on account of over-charge on one car load of lumber from Hazelhurst, Wisconsin, to Malta, Illinois, to $2,334.46 refund for overcharge on 32 carloads of steel rails and angle iron from Menominee, Michigan, to Bouse, Arizona. In the aggregate these 257 orders called for the refunding of $30,272, or nearly $118 per order. Omitting 14 refunds of over $500 each, the remaining orders averaged only $58 each.

It is not by the sum of these orders, however, that the chief burden on railway revenues is impaired, but in the principle of reduced rates or compensation for services that runs through them all.

ONEROUS CALLS FOR INFORMATION.

As though the voluminous annual reports, consisting of 122 pages, and the monthly details of revenues and expenses and the separate reports of accidents, and the numerous other special reports had not encumbered its files with sufficient information as to every conceivable phase of railway affairs, the Commission in October turned in a "hurry call" for an enormous amount of additional data concerning their operations and financial conditions. Coming on top of exhaustive data furnished to the Postmaster General in connection with the inquiry as to mail pay, this call seemed almost as vexatious as it was burdensome. Here is how it looked to the *Journal of Political Economy*, a conservative publication in full sympathy with the Commission's activities:

"The circular, although nominally a call for statistical information authorized as a feature of the proceedings, in the pending railroad-rate cases, is actually very much more inclusive than the technical requirements of those cases would call for. It makes demands for elaborate data with respect to the physical equipment of railroads and the amount of actual betterments that have been put into the work of construction during specified years (in April, May, June, July, August and September of 1907, 1908, 1909 and 1910). After covering all this branch of the subject in very great detail, the schedule goes on to make request for a more inclusive set of facts regarding capitalization than has heretofore been called for by the government. The roads are asked to state the amount and character of their outstanding securities, the conditions under which each class of securities was issued, the amount and kind of return obtained for such securities, whether in property, franchises, services or equipment, the rates at which securities were issued and placed on the market, the character of the liens outstanding against each of the roads, and a variety of other detailed information. * * * Grave doubt has arisen with reference to the power of either of these Commissions (the Interstate and the Railroad Securities Commission) to impose so heavy a burden upon the railroads as is implied in the preparation of these elaborate statistics. Much of the material is, or ought to be, found in the voluminous reports heretofore furnished to the Interstate Commission by the roads, and some of the more recent elements have been covered in reports made to the Postmaster General and bearing on the subject of railway-mail pay. The gathering of the matter is burdensome, and the situation has called attention to the very severe demands of similar kinds that are being made upon all classes at the present time. Within the past few years, there have been calls for statistics and other information practically duplicating one another many times over. The cost and annoyance involved in complying with such government requests have irritated many private concerns to the point of refusing, save in so far as actually compelled by law, to comply with the drafts thus made upon them. With reference to the Capitalization Commission, particularly, the point is being enforced that no authority resides in that body to make any demands upon the roads or any other private concerns."

In regard to the concluding sentence, it should be said that the railways have interposed no obstacle to either Commission, authority or no authority, getting all the facts bearing upon the present and past cost, capitalization, operation, maintenance and value of their property. They court the publicity that seems reserved for them above all other American industries, for through that publicity they look for their ultimate vindication as the most efficient system of transportation on the face of the globe. It is through publicity that they expect to reap the best results of Regulation—public confidence and fair treatment.

REVIEW OF THE LAST FOUR CALENDAR YEARS.
1907–1910.

Before passing to the railway statistics for the fiscal year 1909-10, it may not be amiss to take a brief survey of the income account of the railways of the United States for the year just closed in connection with the three years immediately preceding. This review by months, better than any statement based on returns for "years ending June 30," reveals the effect of the depression of 1907 on rail operations and the gradual return to normal conditions reached during the first six months of 1910. By the same token, we will not know the true measure of the recession which set in last July until the close of the current fiscal year.

The statements which follow are compiled from the final returns to the Interstate Commerce Commission to June 30, 1910, except that the information for the first six months of 1907, antedating the monthly returns, are computations. The figures for the last half year are taken from the monthly bulletins issued by the Commission.

SUMMARY OF GROSS EARNINGS OF THE RAILWAYS OF THE UNITED STATES DURING THE CALENDAR YEARS 1907, 1908, 1909 AND 1910 BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907	1908	1909	1910
Average mileage	227,000	231,584	234,950	239,543
January........	$ 199,000,000	$ 173,611,809	$ 183,264,062	$ 211,041,034
February.......	178,300,000	161,085,493	174,574,962	202,825,379
March..........	211,700,000	183,509,935	205,838,332	238,725,772
April..........	214,800,000	175,071,604	197,024,777	225,856,173
May............	224,800,000	174,527,138	201,596,697	235,134,352
June...........	223,000,000	184,047,216	210,182,483	237,988,124
Half year.....	$1,251,600,000	$1,051,853,195	$1,172,481,313	$1,351,570,834
July...........	$ 228,672,250	$ 195,245,655	$ 220,351,074	$ 230,615,775
August.........	241,303,469	206,877,014	236,982,568	254,005,972
September.....	234,386,899	219,013,703	246,335,585	256,647,702
October........	250,575,757	233,105,042	260,821,546	263,464,605
November.....	220,445,465	211,281,504	247,564,470	248,559,120
December......	194,304,969	205,455,170	222,692,091	236,835,304
Half year.....	$1,369,688,809	$1,270,978,038	$1,434,747,334	$1,490,128,478
Total.......	$2,621,288,809	$2,322,831,233	$2,607,228,647	$2,841,699,312
Earnings per mile..........	$ 11,548	$ 10,030	$ 11,099	$ 11,863
Decrease from preceding year	....	$ 298,457,576	....	....
Increase over preceding year	....	....	$ 284,397,414	$ 234,470,665

SUMMARY OF OPERATING EXPENSES OF THE RAILWAYS OF THE UNITED STATES DURING THE CALENDAR YEARS 1907, 1908, 1909 AND 1910 BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907	1908	1909	1910	Operating Ratio	
					1909	1910
January	$134,225,000	$132,502,830	$132,772,982	$153,631,376	72.45	72.79
February	121,500,000	123,773,906	125,333,008	145,849,126	71.79	71.91
March	142,425,000	128,200,065	136,179,626	160,402,961	66.17	67.19
April	144,990,000	124,284,164	134,615,147	159,130,278	68.32	70.45
May	151,740,000	123,932,568	135,879,398	163,361,830	67.40	69.47
June	150,525,000	124,208,561	136,138,484	160,814,779	64.77	67.57
Half year	$845,405,000	$756,902,094	$800,918,645	$943,190,350	68.31	69.78
Ratio	67.7%	72%	68.31%	69.78%	....	....
July	$152,992,445	$127,978,304	$141,894,877	$157,458,228	64.39	68.28
August	156,837,914	131,557,475	146,465,215	164,488,898	61.80	64.76
September	156,631,780	137,155,143	150,886,069	165,067,268	61.25	64.32
October	166,999,266	144,195,330	156,720,318	169,852,381	60.09	64.47
November	154,150,468	136,809,421	153,181,073	164,636,682	61.88	66.23
December	142,631,008	136,867,622	154,224,786	166,478,299	69.25	70.29
Half year	$930,242,881	$814,563,295	$903,372,338	$987,979,756	62.98	66.10
Ratio	68%	64.1%	62.98%	66.10%	....	....
Total	$1,775,647,881	$1,571,465,389	$1,704,290,983	$1,931,172,106	65.37	67.98
Ratio	67.8%	67.7%	65.37%	67.98%	....	....
Decrease from preceding year	....	$204,182,492	....	....	....	....
Increase over preceding year	....	....	$132,825,594	$226,881,123	....	....
Expenses per mile	$ 7,822	$ 6,786	$ 7,255	$ 8,068	....	....

Summary of Net Operating Revenues of the Railways of the United States for the Calendar Years 1907, 1908, 1909 and 1910 by Months and Half-yearly Divisions.

	1907	1908	1909	1910	Increase or Decrease 1910–1909
January....	$ 64,775,000	$ 41,108,979	$ 50,491,080	$ 57,409,657	Inc. $ 6,918,377
February...	56,800,000	37,311,587	49,241,953	56,976,253	" 7,734,300
March......	69,275,000	55,309,870	69,658,705	78,322,810	" 8,664,105
April.......	69,810,000	50,787,440	62,409,629	66,725,896	" 4,316,267
May........	73,060,000	50,594,569	65,717,299	71,772,522	" 6,055,223
June........	72,475,000	59,838,655	74,043,999	77,173,344	" 3,129,345
Half year.	$406,195,000	$294,951,100	$371,562,665	$408,380,482	Inc. $36,817,817
July........	75,679,804	67,267,351	78,456,197	73,157,547	Dec. 5,298,650
August.....	84,465,554	75,319,538	90,517,352	89,517,074	" 1,000,278
September .	77,755,119	81,858,559	95,449,518	91,580,433	" 3,867,083
October....	83,576,490	88,909,712	104,101,228	93,612,224	" 10,489,004
November .	66,294,996	74,472,082	94,383,397	83,922,437	" 10,460,960
December..	51,673,960	68,587,499	68,467,304	70,357,004	Inc. 1,889,700
Half year.	$439,445,923	$456,414,741	$531,374,996	$502,146,719	Dec $29,228,277
Twelve months.	845,640,923	751,365,841	902,937,662	910,527,211	Inc. 7,589,539
Taxes......	83,156,188	86,872,885	94,664,213	109,560,422	Inc. 14,896,209
Net operating income	$762,484,735	$664,492,955	$808,273,449	$800,966,789	Dec. $7,306,660
Per mile of line.......	3,359	2,869	3,441	3,344	....

On the face of these three tables, as in a mirror, may be read the financial story of American railways for the past four years, unmuddled by any bewildering changes in accounting or nomenclature.

Here may be read the culmination of the decade of railway prosperity in the record monthly receipts of October, 1907; the sensational drop of nearly $90,000,000 by February, 1908; the long drag of decreased earnings through the remainder of that year; the gradual recovery beginning a year later in December, 1908, to continue with scarcely a check until last October, when the highest figures o monthly receipts were reached, although the signs of another recession were even then apparent.

Here, on the reverse side of the ledger, in the second table, is to be found the tale of frantic retrenchment which accompanied and sought to break the fall of nearly $300,000,000 in railway revenues shown during the year 1908. In the high ratio of expenses to revenues for the last half of 1907 (68%) and first half of 1908 (72%) is to be found corroboration of Professor Adams' comment that "while revenues quickly respond to changes in commercial conditions, operating expenses respond but sluggishly to the efforts of the management to bring them under control". Here too is to be traced the effects of the increases in the wage scale in 1907 and 1910—the numbers employed, but not the scale, having been reduced to meet the decreased receipts of 1908 and 1909.

In the third table is to be read the story of railway vicissitudes as told in the monthly net revenues. Here is to be noted the drop of over 55% in net revenues between October, 1907 and February, 1908, and the steady advance to the high mark of October, 1909. The former was caused by the failure of revenues, the advance in net due to those drastic economies of maintenance that have crippled the recuperative powers of the railway industry in the face of the heaviest traffic it has ever handled.

The present emergency confronting the railways is told in the net revenues of the last six months of 1910, which were $29,228,279 below those of the corresponding months in 1909—being so large that with the increase in taxes for the year they left the net income of the railways for the calendar year $7,306,660 below that of the preceding year.

And all this in the face of the largest gross revenues the railways have ever earned and in spite of economies in operation, especially in maintenance, that the railways should not be forced to adopt. The public cannot escape the injury adverse conditions have imposed on its transportation service.

INCOME ACCOUNT FOR THE CALENDAR YEARS 1910 AND 1909.

From the same monthly summaries it has been possible to contrast the following comparative statement of operating revenues and expenses of the railways for the calendar years 1910 amd 1909, with the ratios of the several items to gross revenues:

STATEMENT OF OPERATING RECEIPTS AND EXPENSES OF THE RAILWAYS OF THE UNITED STATES FOR THE CALENDAR YEARS 1910 AND 1909 WITH RATIOS.

	1909	Ratio to Gross Earnings	1910	Ratio to Gross Earnings
Miles of line operated	(a) 234,950	....	(b) 239,975	....
Receipts from:				
Freight	$1,796,256,314	68.96	$1,966,478,759	69.20
Passengers	601,722,959	23.10	647,739,773	22.79
Other transportation revenue	182,706,090	7.01	199,181,220	7.01
Non-transportation revenue	24,080,802	.93	28,299,559	1.00
Total revenues	$2,604,766,165	100.00	$2,841,699,311	100.00
Expenses:				
Maintenance way and structures	339,167,666	13.02	383,133,718	13.49
Maintenance of equipment	387,155,080	14.86	430,928,959	15.16
Traffic expenses	53,257,408	2.04	58,643,461	2.07
Transportation	857,339,037	32.92	986,756,731	34.74
General expenses	65,441,053	2.52	71,634,766	2.52
Unclassified	16,809	....	74,472	....
Total expenses	$1,902,377,052	65.36	$1,931,172,107	67.98
Net operating revenues	902,389,112	34.64	910,527,204	32.02
Profit from outside operation	3,367,713	....	....	....
Net revenues	$905,756.825	....	....	....
Taxes	92,964,510	3.56	109,560,422	3.85
Net income	$812,792,315	....	....	....

(a) At the close of the year 1909 the reports covered 236,166 miles of operated line.

(b) At the close of the year 1910 the reports covered 241.364 miles of operated line.

NOTE.—The figures for 1909 are those given by the Commission in its annual report and differ slightly from those in the other tables.

The significant feature of this table, as of those that preceded it, is that with revenues in excess of anything known in the history of American railways operating expenses and taxes increased so rapidly that the net income for the year was materially less in 1910 than in 1909.

The column of ratios shows that the increase in expenditures is not confined to any department. The wage advance of last spring is in evidence throughout these tables.

When the necessary assignments and deductions for depreciation, renewals, betterments, reserves and surplus are made, it will be found that not over $600,000,000 is left to pay interest and dividends on the net billions irrevocably invested in American railways, and $600,000,000 is only 4% on fifteen billion dollars. Such a return is perilously near the line that invites capital to look elsewhere for investments.

THE BUREAU'S STATISTICS FOR 1910.

In presenting the statistics which follow for the year ending June 30, 1910, the facts and figures will be given with as little comment as is consistent with a clear apprehension of their significance. So far as may be the summaries will follow the forms approved by the practice and experience of the Interstate Commerce Commission prior to 1907, and will reproduce the results of former years as necessary for anything like comparative analysis.

For the sake of brevity, the Interstate Commerce Commission will be referred to herein as the "Commission"; the Commission's "Statistics of Railways in the United States" as "Official Statistics", and "the year ending June 30th" will be implied before the year named unless otherwise specified.

The statements as to foreign railways are compiled from the latest official sources available.

In addition to the acknowledgment already made for the courteous co-operation of railway officials, the writer wishes to record his personal appreciation of the assistance always cheerfully rendered to the Bureau by federal and state commissions, who have regarded its work as complementary to their own in the matter of publicity touching railway affairs, even though differing as to the bearing of the facts.

It is worthy of note that the reports received by the Bureau for the year 1910, cover 227,525 miles of line, or approximately 95% of the mileage and 97% of the railway traffic of the United States. Furthermore the mileage reporting to the Bureau is almost identical with the total mileage (227,454) for which results of operation were reported to the Interstate Commerce Commission in 1907—a fact which bears witness to the comprehensive character of the Bureau's information.

SLASON THOMPSON.

CHICAGO, March 24, 1911.

I

RAILWAY MILEAGE IN 1910

In its preliminary income report for the year ending June 30, 1910, compiled from the monthly returns, the Interstate Commerce Commission gives the average railway mileage operated in the United States during the year as 239,052 miles, with the total operated at the close of the year as 239,652.

The returns to this Bureau, compiled from the annual reports for the same year, cover 227,525 miles, against 221,132 miles in 1909, an increase of 6,393. The income and traffic statistics of this report, therefore, cover almost 95 per cent of the total mileage and, by reason of their nature, slightly more than 97 per cent of the railway traffic of the United States.

In passing it is interesting to note that the operated mileage reporting to the Bureau in 1910 is almost precisely the same as that covered by the Interstate Commerce Commission Statistics for 1907, viz.: 227,525 miles for the former to 227,454 for the latter. In traffic, however, the Bureau's figures for 1910 are considerably higher than the official figures for 1907, or any year since.

According to the Commission's report for 1909, its assignments per mile for operating and traffic statistics were based on single-track operated mileage of 235,402 miles, allowance being made for 9,396 miles operated under trackage rights. These are the figures which will be used in comparison with those of the Bureau for 1910, allowance being made in the latter instance for 9,307 miles operated under trackage rights.

One distinction should be borne in mind constantly, the Commission's statistics exclude returns from switching and terminal companies, whereas those of the Bureau, like the monthly returns to the Commission, include switching and terminal companies, so far as possible. The latter are comparable with all official statistics prior to and including 1907.

* * * * * * * *

The first summary under this title presents the operated mileage reported to the Bureau in 1910 and 1909 classified by states in comparison with the official mileage in 1909, with relation to area and population of the respective territorial divisions. The assignment as to population is made for the first time under the Census for 1910:

Summary of Railway Mileage in the United States, by States, for the Years Ending June 30, 1910, and its Relation to Area and Population (Census 1910).

	Bureau's Figures		Commission's Figures		Population per Mile of Line 1910*
	1910 Miles Operated	1909 Miles Operated	1909 Miles Owned	Miles of Line per 100 Sq. Miles	
Alabama	4,992	4,917	4,977	10.02	429
Arizona	1,811	1,705	1,994	1.77	102
Arkansas	4,177	3,996	5,134	9.87	306
California	6,422	6,376	7,379	4.83	322
Colorado	5,598	5,228	5,409	5.26	147
Connecticut	1,002	930	1,005	20.74	1,109
Delaware	340	342	337	17.18	600
Florida	3,839	3,117	4,173	7.84	180
Georgia	6,498	6,485	6,890	11.77	378
Idaho	1,962	1,651	2,117	2.53	154
Illinois	12,751	13,216	11,834	21.16	476
Indiana	7,345	7,774	7,383	20.56	365
Iowa	9,945	9,923	9,747	17.58	228
Kansas	9,146	9,125	8,947	10.96	189
Kentucky	3,425	3,229	3,421	8.67	669
Louisiana	4,294	3,860	5,315	12.01	312
Maine	2,068	1,984	2,106	7.24	352
Maryland	1,292	1,325	1,409	14.66	919
Massachusetts	2,086	2,079	2,101	26.32	1,602
Michigan	8,458	8,384	9,052	15.77	310
Minnesota	8,596	8,258	8,530	10.82	243
Mississippi	3,343	3,545	4,349	9.49	413
Missouri	8,329	8,200	8,032	11.71	410
Montana	4,221	3,537	4,099	2.85	92
Nebraska	6,150	6,099	6,015	7.83	198
Nevada	1,685	1,621	2,121	1.95	39
New Hampshire	1,213	1,211	1,249	13.87	345
New Jersey	2,193	2,046	2,251	29.98	1,127
New Mexico	2,939	2,782	3,004	2.45	108
New York	8,103	8,106	8,421	17.74	1,082
North Carolina	4,089	3,567	4,761	10.00	463
North Dakota	4,130	4,026	4,200	15.98	137
Ohio	8,906	8,951	8,960	22.27	532
Oklahoma	5,648	5,572	5,769	8.28	287
Oregon	1,793	1,687	2,159	2.28	313
Pennsylvania	10,530	10,532	11,141	24.91	688
Rhode Island	196	192	213	20.18	2,550
South Carolina	2,878	2,892	3,375	11.26	449
South Dakota	3,739	3,646	3,948	5.14	148
Tennessee	3,553	3,283	3,679	9.01	594
Texas	13,484	12,847	13,459	5.15	290
Utah	1,821	1,820	1,957	2.38	190
Vermont	941	941	1,067	11.91	333
Virginia	4,396	4,099	4,412	11.18	467
Washington	4,543	3,353	4,634	6.95	246
West Virginia	2,787	2,846	3,390	14.21	360
Wisconsin	6,746	7,039	7,274	13.67	321
Wyoming	1,457	1,429	1,573	1.66	93
District of Columbia	52	51	35	58.78	9,459
Canada†	1,383	1,343	....	....	....
Mexico‡	230	....	....	....	....
United States	227,525	221,132	234,799	7.98	392

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*Census figures 1910 divided by the Commission's figures for 1909.

†Mileage operated in Canada by American roads. ‡Mileage operated in Mexico by American roads.

You can put your finger on states in this table where any law to prevent the issue of railway securities at less than par will be a denial of transportation facilities for which there is crying need.

The relation of railway mileage to area and population in the United States, since accurate figures have been kept, is shown in the next summary:

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES, 1910 TO 1890, AND ITS RELATION TO AREA AND POPULATION.

Year Ending June 30	Miles of Line Owned (Official)	Miles of Line per 100 Sq. Miles of Territory	Inhabitants per Mile of Line
1910	239,652	8.07	383
1909	234,799	7.98	*373
1908	230,494	7.76	378
1907	227,671	7.74	370
1906	222,575	7.55	373
1905	217,018	7.34	378
1904	212,577	7.20	379
1903	207,187	7.00	384
1902	201,673	6.82	388
1901	196,075	6.64	391
1900	192,941	6.51	393
1899	188,277	6.37	395
1898	185,371	6.28	394
1897	182,920	6.21	390
1896	181,154	6.15	384
1895	179,176	6.08	382
1894	176,603	6.02	379
1893	170,332	5.94	377
1892	165,691	5.78	380
1891	164,603	5.67	380
1890	159,272	5.51	384

*Computed on the Commission's estimate of population for 1909.

This table demonstrates how railway extension has kept abreast of the country's growth during the last two decades. In proportion to territory, the United States has nearly 45% more miles of railway than in 1890, and in proportion to population the last column proves that railway building has kept pace with population increasing at the rate of nearly 21% per decade.

In the table of mileage by states the admission of New Mexico into the regular alphabetical roll by placing it between New Jersey and New York affords a striking example by juxtaposition of the contrast in conditions under which railways are operated in the United States. But even this contrast is not so great as that between the conditions in Rhode Island and Nevada.

RAILWAYS BUILT IN 1910.

There was a slight increase in the miles of railway built during 1910 as compared with the preceding year, as appears from the following summary of new mileage from the Railway-Age Gazette of December 30, 1910:

SUMMARY SHOWING MILEAGE OF RAILWAYS BUILT IN THE UNITED STATES IN THE CALENDAR YEAR 1910 CLASSIFIED BY STATES.

State	Number of Companies	Miles Built 1910
Alabama	5	78.96
Alaska	2	61.00
Arizona	3	100.82
Arkansas	4	41.79
California	13	191.61
Colorado	3	76.08
District of Columbia	....	....
Florida	6	84.38
Georgia	6	65.07
Idaho	10	276.71
Illinois	3	64.89
Indiana	....	....
Iowa	3	46.17
Kansas	1	15.00
Kentucky	4	41.00
Louisiana	9	71.45
Maine	2	32.75
Maryland	....	....
Michigan	3	28.88
Minnesota	6	244.53
Mississippi	3	21.65
Missouri	4	24.20
Montana	4	115.47
Nebraska	....	....
Nevada	1	12.25
New Hampshire	....	....
New Jersey	1	6.90
New Mexico	1	6.00
New York	2	5.99
North Carolina	4	105.97
North Dakota	3	300.96
Ohio	....	....
Oklahoma	4	171.00
Oregon	10	244.09
Pennsylvania	4	28.26
South Carolina	3	19.64
South Dakota	4	205.58
Tennessee	4	39.86
Texas	28	756.35
Utah	....	....
Vermont	....	....
Virginia	4	22.81
Washington	9	369.50
West Virginia	6	52.90
Wisconsin	6	90.63
Wyoming	1	0.48
Total	189	4,121.58
Total 1909	190	3,748.28
Canada	16	1,843.80
Mexico	3	138.27

Note may be made of the large mileage built in the states of Idaho, Montana, North and South Dakota and Washington. How much of this should be credited to the Chicago, Milwaukee & Puget Sound Railway, which was completed through to Seattle during the year, is not told. This piece of constructive railway work, carried through in less than four years at a cost of over $200,000,000, as regards dispatch of construction, cost and usefulness to the American people, may be compared with the cutting of the canal at Panama, for the right to build which the United States paid $50,000,000 in

1904 and which we have hopes of seeing completed in 1915 at a cost of ? ? ? ? ? ? ? ? ($180,000,000 had been expended to March 1, 1910.)

RAILWAY MILEAGE OF FOREIGN COUNTRIES.

By way of contrast the next summary gives the railway mileage of foreign countries for 1908, together with its relation to area and population, according to the latest foreign authorities:

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO MILEAGE TO AREA AND POPULATION IN EACH COUNTRY IN 1908. TRANSLATED
From Archiv fur Eisenbahnwesen, May-June, 1910.

Countries	Miles 1908	Miles of Line per 100 Square Miles 1908	Inhabitants per Mile of Line 1908
EUROPE			
Germany	36,601	17.5	1,540
Austria-Hungary, including Bosnia	26,434	10.1	1,782
Great Britain and Ireland	23,103	19.1	1,794
France	29,836	14.5	1,305
Russia in Europe, including Finland	36,482	1.7	2,866
Italy	10,365	9.3	3,133
Belgium	5,038	44.3	1,328
Netherlands, including Luxemburg	2,240	15.1	2,384
Switzerland	2,814	17.5	1,181
Spain	9,236	4.8	1,944
Portugal	1,794	5.0	3,025
Denmark	2,160	14.5	1,133
Norway	1,781	1.4	1,247
Sweden	8,452	4.8	607
Servia	420	2.2	5,938
Roumania	2,011	4.0	2,940
Greece	770	3.0	3,174
European Turkey, Bulgaria and Rumelia	2,014	1.9	4,877
Malta, Jersey and Isle of Man	68	10.1	5,470
Total for Europe, 1908	201,619	5.3	1,941
" " " 1907	199,345	5.3	1,887
" " " 1906	196,437	5.2	1,993
" " " 1905	192,507	5.1	2,084
" " " 1904	189,806	5.0	2,084
" " " 1903	186,685	5.0	2,084
" " " 1902	183,989	4.9	2,127
" " " 1901	180,817	4.8	2,174
" " " 1900	176,396	4.7	2,220
" " " 1899	172,953	4.6	2,220
" " " 1898	167,614	4.4	....
" " " 1897	163,550	4.3	....
" " " 1896	160,030	4.2	....
Increase in twelve years	41,589	....	....

Summary of the World's Railways and Ratio Mileage to Area and Population in Each Country in 1908. Translated—Continued.

Countries	Miles 1908	Miles of Line per 100 Square Miles 1908	Inhabitants per Mile of Line 1908
AMERICA			
British North America (Canada)	23,254	0.6	229
United States (including Alaska)	233,472	6.4	366
Mexico	14,821	1.9	981
Brazil	11,911	0.32	1,253
Argentine Republic	15,439	1.4	316
Chili	2,932	.9	1,130
Peru	1,468	0.32	3,138
Total America, including other divisions	312,626	2.16	767
ASIA			
Russia in Central Asia	2,802	1.2	2,762
Siberia and Manchuria	6,409	0.12	900
China	4,986	0.1	71,650
Japan	5,023	3.0	9,266
British India	30,502	1.6	9,668
Total Asia, including other divisions	58,671	.36	15,042
AFRICA			
Egypt	3,496	0.9	2,812
Algiers and Tunis	3,042	0.8	2,200
Cape Colony	3,861	1.2	431
Natal	974	3.5	798
Transvaal	1,742	1.4	498
Orange Colony	883	1.7	235
Total Africa, including other divisions	19,165	.17	6,890
AUSTRALASIA			
Zealand	2,580	2.4	322
Victoria	3,421	3.8	351
New South Wales	3,464	1.1	395
South Australia	2,007	0.16	180
Queensland	3,483	0.4	139
Tasmania	619	2.4	277
West Australia	2,254	0.16	182
Total Australasia, including Hawaii	17,916	0.6	316
RECAPITULATION			
Europe	201,620	5.3	1,941
America	312,626	2.16	767
Asia	58,671	.36	15,042
Africa	19,165	.17	6,890
Australasia	17,916	0.6	316
Total for the world	609,998	1.25	2,370

It cannot have escaped the most cursory glance that the mileage of the Americas exceeds that of all other continents and to that result the United States contributes nearly 75%. A less obvious, though more significant, fact is disclosed by this table that 337,777 miles, or over 55% of the entire railway mileage of the world, lies in countries where English is the vernacular of the executive staff, in the engine cab and the caboose.

Another fact is brought into the limelight by this array of figures—the American citizen commands the service of five miles of railway to one mile that serves the average European; and nowhere in Europe, except in Sweden, is there an approach of nearer than 3 to 1 in favor of the American traveller or shipper.

RELATION OF RAILWAYS TO AREA AND POPULATION—AMERICA AND EUROPE COMPARED.

Early in the discharge of its difficult task of organizing railway regulation, the Commission very wisely divided the United States into ten territorial groups. This was rendered necessary by the widely different conditions under which railways were operated in an area of 3,000,000 square miles. Today these groups enable us to get a better idea of the problem involved in regulating American railways than is possible through comparing them as a whole with the systems of any other country or continent.

In the following summary the area, population and railway mileage of eight groups are compared with the like data for European countries or groups approaching them in area. The European groups are of contiguous states as near as practicable. A separate comparison has to be made for Russia, which territorially is equal to the Commission groups VII, VIII, IX and X.

COMPARATIVE SUMMARY OF AMERICAN TERRITORIAL RAILWAY GROUPS AND GROUPS OF EUROPEAN COUNTRIES OF APPROXIMATELY THE SAME AREA.

GROUP I.

	UNITED STATES Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut	EUROPEAN STATES Denmark, Holland, Belgium, Alsace-Loraine, (a) Luxemburg and Switzerland
Area, square miles	61,946	60,844
Population	6,552,681	21,340,101
Miles of railway	7,789	13,766
Inhabitants per mile of line	841	1,550

(a) With apologies to Germany, to connect Belgium and Switzerland.

COMPARATIVE SUMMARY OF AMERICAN TERRITORIAL RAILWAY GROUPS AND GROUPS OF EUROPEAN COUNTRIES OF APPROXIMATELY THE SAME AREA—CONTINUED.

GROUP II.

	New York, New Jersey, Pennsylvania, Delaware, Maryland and District of Columbia	Great Britain and Ireland, Isle of Man and Channel Islands
Area, square miles	111,965	121,391
Population	21,145,629	45,239,627
Miles of railway	22,390	23,103
Inhabitants per mile of line	944	1,958

GROUP III.

	Ohio, Indiana and Southern Peninsula of Michigan	Italy
Area, square miles	114,103	110,659
Population	9,985,342	34,269,764
Miles of railway	24,119	10,365
Inhabitants per mile of line	414	3,306

GROUP IV.

	Virginia, West Virginia, North and South Carolina	Greece, Turkey, Bulgaria and Servia
Area, square miles	143,519	145,907
Population	7,004,418	15,485,797
Miles of railway	13,393	3,204
Inhabitants per mile of line	523	4,833

GROUP V.

	Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi	Norway and Sweden
Area	293,095	296,965
Population	11,771,641	7,782,386
Miles of railway	26,304	10,233
Inhabitants per mile of line	447	761

GROUP VI.

	Illinois, Iowa, Wisconsin, Minnesota and parts of Michigan, Missouri and the Dakotas	Germany 36,601, Austria 14,402 and Poland 1,860
Area	373,995	368,012
Population	14,445,528	94,473,613
Miles of line	49,485	52,863
Inhabitants per mile of line	292	1,787

COMPARATIVE SUMMARY OF AMERICAN TERRITORIAL RAILWAY GROUPS AND GROUPS OF EUROPEAN COUNTRIES OF APPROXIMATELY THE SAME AREA—CONTINUED.

GROUP VII.

	Nebraska, Montana, Wyoming and parts of Colorado and the Dakotas	France, Spain and Portugal
Area	418,401	433,379
Population	2,225,609	64,387,984
Miles of Railway	12,119	40,866
Inhabitants per mile of line	183	1,575

GROUP VIII.

	Kansas, Arkansas, Oklahoma and parts of Missouri, Colorado, Texas and New Mexico	Hungary, Roumania, Bosnia, Montenegro and Finland*
Area	365,633	343,745
Population	7,947,263	29,719,903
Miles of railway	31,838	16,921
Inhabitants per mile of line	249	1,756

*Finland, a non-contiguous state, added to approximate the area.

GROUPS IX AND X.

	IX—Louisiana, Texas excluding Panhandle, and parts of New Mexico (331,807 square miles) (a) X—Washington, Oregon, California, Idaho, Nevada, Utah, Arizona and part of New Mexico (756,662 square miles) (b). Plus Groups VII and VIII as above	Russia, excluding Poland and Finland
Area	1,875,503	1,859,195
Population	21,068,057	101,727,341
Miles of railway	81,185	32,519
Inhabitants per mile of line	259	3,128

*U. S. Groups VII and VIII are included in order to approximate the area of Russia.

(a) Group IX has a population of 5,605,645 and 16,758 miles of railway.

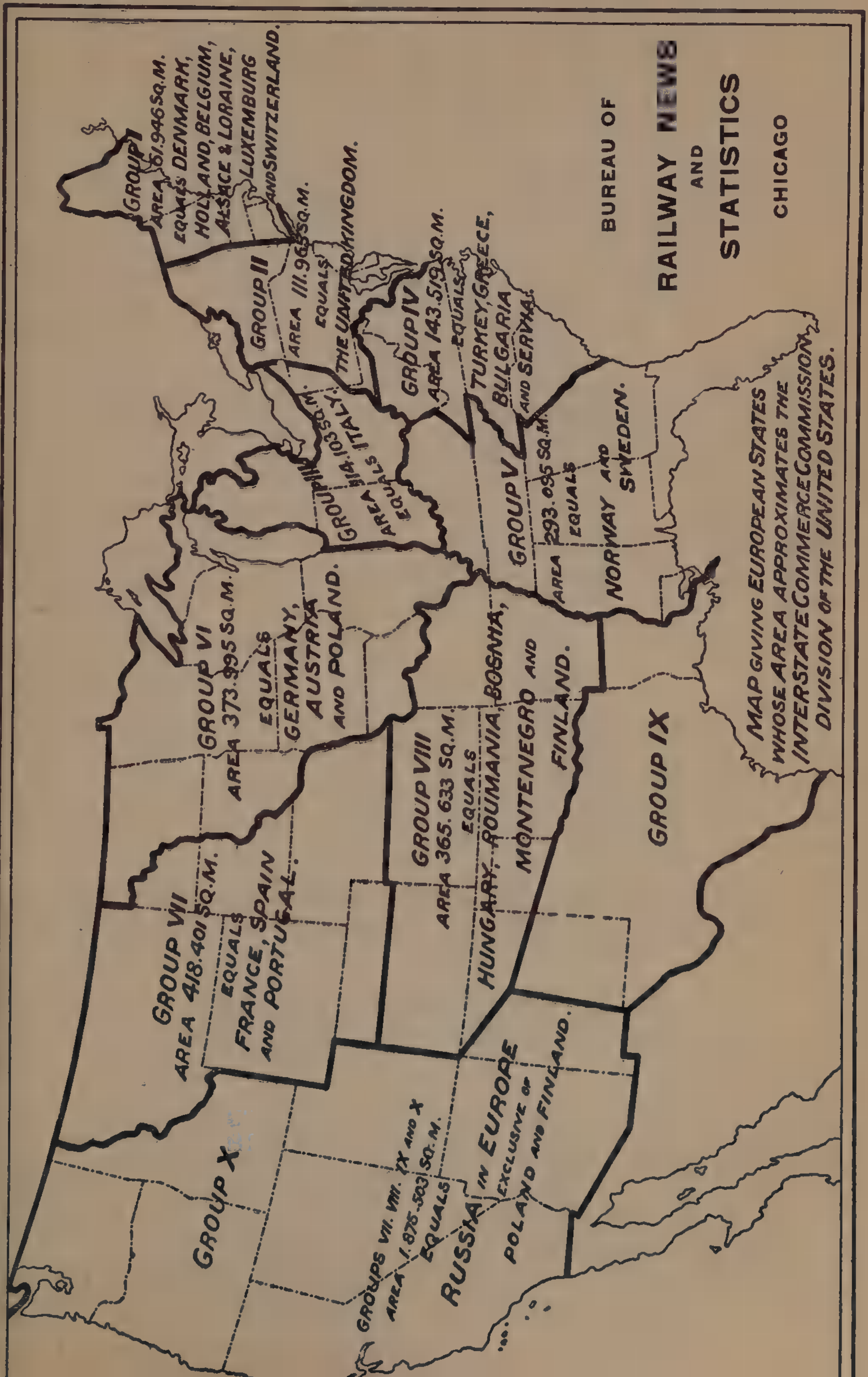
(b) Group X has a population of 5,286,411 and 20,913 miles of railway.

TOTAL.

	United States	Europe
Area	2,974,126	3,740,097
Population	91,972,137	414,426,516
Miles of railway	224,665	203,840
Inhabitants per mile of line	409	2,033

These figures vary slightly from those given elsewhere because the total mileage for the United States is exclusive of line operated under trackage rights (9,396 miles) and 1,343 miles not in United States territory, and the European figures are fuller than those taken from *Archiv fur Eisenbahnwesen.*

No comment is needed to emphasize the contrast between the provision made by American railways for the public service per capita and that made by European railways. If it were, the accompanying map supplies it:


GROUP I
AREA 51.946 SQ.M.
EQUALS DENMARK, HOLLAND, BELGIUM, ALSACE & LORAINE, LUXEMBURG AND SWITZERLAND.
GROUP II
AREA 111.965 SQ.M.
EQUALS THE UNITED KINGDOM.
GROUP III
AREA 114.103 SQ.M.
EQUALS ITALY.
GROUP IV
AREA 143.519 SQ.M.
EQUALS TURKEY, GREECE, BULGARIA AND SERVIA.
GROUP V
AREA 293.055 SQ.M.
EQUALS NORWAY AND SWEDEN.
GROUP VI
AREA 373.995 SQ.M.
EQUALS GERMANY, AUSTRIA AND POLAND.
GROUP VII
AREA 418.401 SQ.M.
EQUALS FRANCE, SPAIN AND PORTUGAL.
GROUP VIII
AREA 365.633 SQ.M.
EQUALS HUNGARY, ROUMANIA, BOSNIA, MONTENEGRO AND FINLAND.
GROUP IX
GROUP X
GROUPS VII. VIII. IX AND X
AREA 1.876.503 SQ.M.
EQUALS
RUSSIA IN EUROPE EXCLUSIVE OF POLAND AND FINLAND.
BUREAU OF
RAILWAY NEWS
AND
STATISTICS
CHICAGO
MAP GIVING EUROPEAN STATES WHOSE AREA APPROXIMATES THE INTERSTATE COMMERCE COMMISSION DIVISION OF THE UNITED STATES.

MILEAGE OF ALL TRACKS IN 1910.

Next in importance to transportation service after main lines is the possession of adequate auxiliary tracks and extensive yard tracks at terminals. In these the increase from year to year best reflects the demands of railway traffic. The following statement shows that this increase is being maintained:

SUMMARY OF MILEAGE OF SINGLE TRACK, SECOND, THIRD AND FOURTH TRACK AND YARD TRACK AND SIDINGS IN THE UNITED STATES, 1890 TO 1910.

Year	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	Total Mileage Operated (all tracks)
1910 (95%) Bureau	227,525	21,548	2,219	1,506	84,234	337,032
1909 Official	*235,402	20,949	2,169	1,453	82,376	342,351
1908	*230,494	20,209	2,081	1,409	79,452	333,646
1907	227,455	19,421	1,960	1,390	77,749	327,975
1906	222,340	17,396	1,766	1,279	73,760	317,083
1905	216,973	17,056	1,609	1,215	69,941	306,796
1904	212,243	15,824	1,467	1,046	66,492	297,073
1903	205,313	14,681	1,303	963	61,560	283,821
1902	200,154	13,720	1,204	895	58,220	274,195
1901	195,561	12,845	1,153	876	54,914	265,352
1900	192,556	12,151	1,094	829	52,153	258,784
1899	187,543	11,546	1,047	790	49,223	250,142
1898	184,648	11,293	1,009	793	47,589	245,333
1897	183,284	11,018	995	780	45,934	242,013
1896	182,428	10,685	990	764	44,912	240,129
1895	180,657	10,639	975	733	43,888	236,894
1894	178,708	10,499	953	710	42,661	233,533
1893	176,461	10,051	912	668	42,043	230,137
1892	171,563	9,367	852	626	39,941	222,351
1891	168,402	8,865	813	599	37,318	215,999
1890	163,597	8,437	760	561	35,255	208,612

*Since 1908 the official mileage is exclusive of switching and terminal companies. In 1908 these had 1,624 miles of main track and 2,085 of yard tracks and sidings; in 1909 they reported 1,623 miles of main track and 2,384 of yard tracks and sidings.

In this table it will be perceived that the mileage of auxiliary track, yard track and sidings reported to the Bureau for 1910 in every instance exceeds the official totals for 1909. Adding these returns to the official mileage of single track reported in 1909, and allowing for an increase of 4,000 miles of single track during the year, yields a total of 348,909 miles of railway track employed in the transportation of American people and their goods.

In order to show the distribution and growth of railway track as given by the Commission's territorial groups during the past twenty years, the following table is submitted:

SUMMARY OF MILEAGE, BY GROUPS, SHOWING LENGTH OF SINGLE TRACK, SECOND, THIRD AND FOURTH TRACKS, YARD TRACK AND SIDINGS, 1890 TO 1909.

Group Covered	Single Track Miles	Second Track Miles	Third Track Miles	Fourth Track Miles	Yard Tracks and Sidings Miles	Total All Tracks Miles
I 1909	7,998	1,668	190	131	3,948	13,935
1890	7,425	1,248	29	19	2,399	11,120
II 1909	23,887	7,448	1,292	930	15,720	49,277
1890	17,237	4,948	664	507	7,533	30,899
III 1909	26,037	4,256	459	267	13,541	44,560
1890	20,903	1,048	12	3	6,179	28,145
IV 1909	13,785	941	2	....	3,805	18,533
1890	8,658	26	....	....	1,115	9,799
V 1909	27,487	715	2	2	7,441	35,647
1890	15,877	4	....	....	2,149	18,030
VI 1909	51,602	4,501	215	114	16,920	73,352
1890	38,198	1,012	54	31	7,594	46,889
VII 1909	12,418	530	2	2	3,164	16,116
1890	8,807	13	....	....	1,307	10,127
VIII 1909	33,284	467	8	8	8,476	42,243
1890	21,173	93	2	1	3,111	24,380
IX 1909	17,714	100	....	....	3,817	21,631
1890	7,988	....	....	....	936	8,924
X 1909	21,188	322	....	....	5,543	27,053
1890	10,135	45	....	....	1,387	11,567
United States 1909	235,402	20,949	2,169	1,453	82,376	342,351
1890	156,404	8,437	760	561	33,711	199,875

Here again the eye asks no assistance in locating the regions where the railway need of the hour is not more mileage of single track, but more auxiliary tracks to bring existing mileage up to the demands made upon it. The disparity between single track and adequate and efficient secondary track and sidings noticeable in Group IX (Texas) suggests the restrictive effect of regulation as interpreted in that territory.

MILEAGE AND TRACK OF BRITISH RAILWAYS.

During the year ending December 31, 1909, British railways showed an increase of 71 miles of line and 303 miles of track of all kinds; as appears in the following statement of the length of each track for 1900 and the five years 1905, inclusive, compiled from returns to the British Board of Trade:

MILEAGE OF BRITISH RAILWAYS, 1909 TO 1900

Description of Track	1909	1908	1907	1906	1905	1900
Single track (miles).....	23,280	23,209	23,112	23,063	22,870	21,855
Second track...........	13,121	13,048	12,963	12,934	12,819	12,162
Third track............	1,500	1,435	1,385	1,363	1,324	898
Fourth track...........	1,175	1,141	1,103	1,091	1,067	729
Fifth track.............	230	208	195	186	170	73
Sixth track.............	138	122	117	111	97	36
Seventh track..........	67	59	51	47	40	10
Eighth to 20th tracks...	111	94	87	75	44	2
Sidings.................	14,350	14,353	14,145	14,032	13,891	13,069*
Total trackage.....	53,972	53,669	53,189	52,904	52,322	48,834

*Sidings for 1900 computed from returns for 1903.

It will be perceived that the mileage of the British roads increased only 1,425 miles since 1900, whereas American roads, as already seen, increased 42,846 miles during the same period, even excluding switching and terminal companies mileage in 1909. This was accompanied by an increase of 83,567 of trackage against only 5,138 miles for the British system.

In miles of line the United States has over ten times as many miles as the United Kingdom, its total trackage is six times greater and its double track mileage almost equals the single track mileage of British railways. These contrasts have to be considered whenever comparisons are made of the two systems.

During the decade 1899 to 1909 there were twice as many miles of single track built in the United States as the total single track mileage of the United Kingdom today.

II

EQUIPMENT

Courtesy of the Baldwin Locomotive Works.

The fact that the 231-ton Mallet locomotive in the above cut continues in 1910 to lead the procession of increased size and power from the little one in the rear, as it did in 1909, suggests the posssibility that we have approached the economic limit of weight in the construction of locomotives.

The year 1910 saw a renewal of activity in the building of locomotives and cars. This had fallen off to such an extent in 1908 and 1909 that the official returns for 1909 showed an actual decrease of 15,696 in the number of freight cars reported, and an increase of only 467 in passenger cars and 479 in locomotives. So much larger, however, were the freight cars built in 1909 that there was an increased capacity equal to 1,460 35-ton cars.

The number of locomotives and cars built during the last twelve years, according to the Railway Age-Gazette, was as follows:

SUMMARY SHOWING THE NUMBER OF CARS AND LOCOMOTIVES BUILT DURING THE YEARS 1910 AND 1899.

Year	Locomotives	Number Passenger Cars	Freight Cars
1910*	4,755	4,412	185,357
1909*	2,887	2,849	96,419
1908*	2,342	1,716	76,555
1907*	7,362	5,457	284,188
1906*	6,952	3,167	243,670
1905*	5,491	2,551	168,006
1904	3,441	2,144	60,806
1903	5,152	2,007	153,195
1902	4,070	1,948	162,599
1901	3,384	2,055	136,950
1900	3,153	1,636	115,631
1899	2,475	1,305	119,886
Total	51,464	31,247	1,803,262

*Includes Canadian output.

Allowing 10% off the foregoing figures for the Canadian purchases, the remainders show that 23,279 more locomotives, 17,468 more passenger cars, and 827,899 more freight cars were built in the United States during the period named than appear in the increased equipment reported to the Interstate Commerce Commission. This discrepancy represents the extent to which the equipment built merely covers replacement of locomotives and cars worn out, destroyed or abandoned. Roughly speaking, it means that out of every dollar spent for equipment fifty cents is for replacement and only fifty cents is for additions. Even in numerical replacement there is also an element of betterment. In England and on the continent of Europe every copper or pfenning expended for additions or betterment of equipment is charged to capital account.

Number and Capacity of Locomotives for Nine Years 1910 to 1902.

The next summary gives the number and capacity of steam locomotives for the nine years covering the period since the Commission has included capacity in its reports:

Year	Number	Tractive Power (Pounds)	Weight without Tender (Tons)	Average Weight (Tons)
1910 (97% represented)	57,359	1,546,522,608	4,183,699	72.9
1909*	56,468	1,503,971,444	4,056,733	72.0
1908†	56,867	1,498,793,551	4,012,553	71.0
1907	55,388	1,429,626,658	3,828,045	69.1
1906	51,672	1,277,865,673	3,459,052	66.9
1905	48,357	1,141,330,082	3,079,673	63.6
1904	46,743	1,063,651,261	2,889,492	62.1
1903	43,871	953,799,540	2,606,587	59.4
1902	41,225	839,073,779	2,323,877	56.3
Increase in eight years to 1910	39.1%	84.3%	80%	29.5%

*Excludes locomotives in service of switching and terminal companies and unclassified locomotives.

†Excludes 831 unclassified locomotives, but includes 858 locomotives of switching and terminal companies.

The tractive power of the average locomotive of 1910 was 370 pounds per ton weight as compared with 361 pounds per ton in 1902.

Complete returns will raise the totals in the above table for 1910 approximately to 59,133 locomotives of 1,578,000,000 pounds tractive power and 4,271,000 tons weight exclusive of tenders. These figures are the measure of what the railways are doing to provide motive power for an ever-expanding traffic.

THE AVERAGE COST OF LOCOMOTIVES.

In his brief in the Western Trunk Line case, Mr. Frank Lyon, the attorney for the Commission, cited the testimony of the president of a locomotive building company, to the effect that "the prices of locomotives today (per ton) are about the average of the entire period of ten years for the same product", and that where the price per ton in 1900 was about $154, the price today (last fall) is about $141 or $142."

Now, while there is no reason to question the accuracy of this statement as applied to the miscellaneous product of a particular manufacturing plant, its choice of the price per ton unit conceals a condition which Mr. Lyon, as *amicus curiae*, should have been quick to detect and expose. Railways do not buy locomotives by the ton, but by the class or type, which has been steadily increasing in weight and cost since the day of the little locomotive in the cut at the head of this chapter.

During the past twenty years the average weight per locomotive has nearly doubled. A glance at the preceding table shows an increase of 29.5% during the past eight years. Applied to the weight of average locomotives in 1910 the per ton price given above would yield a total cost of $10,279 per locomotive against only $8,670 for the locomotive of 1902, applying to it the above per ton cost of 1900.

The average weight of the locomotives in service is very far from representing the average weight of those purchased in the same year. The average weight of locomotives purchased in 1910 must have been nearly 100 tons to bring the average of all locomotives in service up to 72.9.

But the record of actual purchases of locomotives by the leading railways during the past decade fails to corroborate the testimony as to per ton cost cited by Mr. Lyon. From those of one company, which certainly does not buy above the market, I am permitted to quote the following prices per ton for freight and passenger locomotives bought during the period named:

LOCOMOTIVE PRICE, PER TON, WITHOUT TENDER.

Year	Switching Locomotives	Freight Locomotives	Passenger Locomotives
1898	....	$142	$160
1899	$215	156	155
1900	....	173	195
1901	....	175	172
1902	....	177	194
1903	....	192	207
1904	....	185	196
1905	....	172	186
1906	196	186	194
1907	....	199	....
1908	....	207	178
1909	163	166	145
1910	202	162	166

NOTE.—No monster Mallets, exceeding, many of them, 200 tons, are included in these purchases.

Behind these per ton prices lies the fact that by reason of the increase in weight of locomotives during the decade the $202 per ton switch engine of 1910 cost $500 more than the $215 per ton engine of 1900; the $162 per ton freight locomotive of 1910 cost $5,550 more than the $173 per ton freight locomotive of 1900, and the $166 per ton passenger locomotive of 1910 cost $4,950 more than the $195 per ton passenger locomotive of 1900.

These phenomena are accounted for by the fact that the switch engines of 1910 weighed seven tons more than their class in 1900; the freight locomotives of 1910, 40 tons more and the passenger locomotives of 1910,43 tons more.

During the period covered by the above table there has been a veritable transformation in the size and type of locomotives. The jump in prices per ton from 1899 to 1900 coincides with the advance which took place that year in nearly everything entering into their construction.

The experience of another road whose purchases during the thirteen year period, 1898 to 1910, inclusive, aggregated nearly $15,000,000, corroborates the above showing, except in details due to a difference in conditions. Reduced to a per ton cost basis, irrespective of class or weight, its actual purchases yield the following average costs per ton, without tender, by the years named:

LOCOMOTIVE COST, PER TON, WITHOUT TENDER, 1898 TO 1910.

Year	Cost per Ton	Year	Cost per Ton
1898	$161	1905	$178
1899	137	1906	173
1900	148	1907	173
1901	176	1908	169
1902	166	1909	146
1903	175	1910	174
1904	172		

Average thirteen years........$171

Here again the failure of the per ton cost to reflect the actual conditions will be understood from the fact that cost of the locomotives bought prior to 1901 was below $10,000 while those purchased in 1910 averaged $17,839 and several cost $19,500 apiece. Since the close of the fiscal year 1910, this cost has been advanced to over $20,000 for a locomotive weighing 120 tons without tender.

The books of this company show that the average cost of 815 locomotives included in the above table was $15,780. Including those bought since June 30, 1910, it was $16,204.

In the process of this inquiry it has developed that, roundly speaking, two-thirds of the locomotives in active service of the railways of the United States have been built since 1897.

In any study of these figures it should be remembered that nearly three-fifths of all locomotives purchased are for freight service. Moreover, it is one of the economies of railway management that large locomotives cost less per ton than smaller ones—the moot question being where the limit of greatest efficiency relatively to cost is reached. One locomotive, however powerful, can never haul more than one train, is a trite way of putting the limitation. Neither can a 200-ton engine be at both ends of the same run at the same time, as two 100-ton engines can.

At the average price per ton during the past years cited by Mr. Lyon, the locomotives of the railways of the United States represent an expenditure of $602,211,000.

At the more accurate average of$182 per ton, they represent an investment of approximately $777,322,000, which is equivalent to slightly over $13,000 per locomotive—a figure at least $2,000 below the average purchase price of the past ten years.

PASSENGER AND FREIGHT CARS.

During the period 1902 to 1910, for which the returns to the Commission cover them, both number and capacity of passenger and freight cars are shown in the next statement:

SUMMARY OF PASSENGER AND FREIGHT CARS, AND CAPACITY OF LATTER, 1910 TO 1902.

Year	Passenger Service	Freight Service		Average Tons	Company's Service Number
		Number	Capacity (Tons)		
1910 (97% represented)..........	45,953	2,091,491	73,303,911	35	104,093
1909 Official*..................	45,584	2,071,338	73,137,546	35	99,090
1908*........................	45,117†	2,096,522	73,086,522	35	96,762
1907.........................	43,973	1,991,557	67,216,144	34	91,064
1906.........................	42,282	1,837,914	59,196,230	32	78,736
1905.........................	40,713	1,731,409	53,372,552	31	70,749
1904.........................	39,752	1,692,194	50,874,723	30	66,615
1903.........................	38,140	1,653,782	48,622,125	29	61,467
1902.........................	36,987	1,546,101	43,416,977	28	57,097
Eight years' increase‡..........	24.2 %	35.2 %	68.8 %	25.0 %	82.3 %

*Does not include cars in service of switching and terminal companies.

†Includes 11,067 cars of switching and terminal companies and excludes 4,550 cars for which complete returns were not secured.

‡Complete returns will increase these percentages.

Complete returns will bring the Bureau's figures for 1910 up to approximately 46,890 passenger cars, and 2,134,000 freight cars, having a capacity of 74,043,000 tons.

The paralyzing effect of the business depression of 1907 upon the equipment of the railways is more clearly apparent in the number and capacity of freight cars reported for the years 1908, 1909 and 1910, in the above table, than in the preceding one relating to locomotives. It will be perceived that the increase which had been very rapid up to 1907 came to an abrupt pause in 1908, and there has been little advance since—purchases of equipment just about taking care of replacement. Moreover, the average capacity per car has been practically unchanged during these three years.

The transformation that is gradually taking place in American freight cars is shown in the following statement giving the number of cars of different capacity by classes in 1902 and 1909.

NUMBER AND CAPACITY OF DIFFERENT SIZES OF FREIGHT CARS, 1902-1909.

Class	Capacity Pounds	1902	1909	Increase or Decrease Per Cent
I.........................	10,000	5,122	2,421	Dec. 52.7
II.........................	20,000	15,615	5,785	63.0
III.........................	30,000	46,353	5,865	87.3
IV.........................	40,000	327,342	126,500	61.4
V.........................	50,000	246,684	150,009	39.2
VI.........................	60,000	634,626	830,612	Inc. 30.9
VII.........................	70,000	22,493	38,926	74.1
VIII.........................	80,000	158,179	522,446	230.4
IX.........................	90,000	310	7,891	2,445.5
X.........................	100,000	48,834	376,988	672.0
XI.........................	110,000	389	3,824	883.0
XII.........................	120,000	43	54	25.6
All over......................	120,000	2	17	....

The passing of the car of less than 30 tons capacity is very marked in this table. Where there were 641,116 of this class of cars in 1902, there were only 290,560 in 1909. In other words, 350,556 freight cars, averaging double the capacity of European "goods wagons", have been worn out or scrapped in the United States in seven years.

Although the 30 ton car still shows an increase from year to year and outnumbers any other class, the prospect is that in aggregate capacity it will be exceeded by the 40-ton car inside of two years, with the 50-ton car not far behind.

With 1909 two hundred 100-ton coal cars, which have figured in the Commission's reports since 1905, have disappeared from its statistics along with the returns from switching and terminal companies.

There has been no increase in the number of freight cars per mile of line since 1908, the figures being 9.06 cars per mile in 1908, 8.81 in 1909, and 8.93 in 1910. The increased capacity of the cars has more than made up for the decrease per mile.

In his report for 1909 the Official Statistician asks, "Have the railways set aside reserves adequate to replace the cars which have gone out of service?" As statistics are merely "prophets of the past", that question remains for the future to answer.

That the providing of adequate equipment becomes yearly more expensive is proved by the fact that where passenger coaches cost an average of $4,905 twenty years ago, the average today is $9,433 (vide report of the Committee of the Association of Transportation and Car Accounting). Where baggage cars cost an average of $3,084 then, they cost $5,193 now; express cars $2,634 then, $3,968 now; combination baggage and mail cars $3,455 then, $5,670 now; and postal cars $4,225 then, $6,942 now.

These prices are all for wooden construction. The same committee gives the following costs for passenger equipment; all steel construction, coaches $8,623 to $15,994—the lower price for steel suburban cars; baggage cars $6,100 to $10,500 and postal cars $8,850 to $14,500. The seating or carrying capacity of these cars is stated to have increased approximately 25%.

In a return made to the Senate on February 6, 1911, the Commission submitted a report of its own experts showing the cost of well-constructed modern post office cars to be as follows:

Class A, wooden construction	$7,500	to	8,000
Class B, all-steel construction	9,500	to	10,000
Class C, wooden construction with steel underframes	8,500	to	9,000

As the Commission reports "the rapidly increasing use" of steel passenger equipment, the average cost of cars in this service must be advancing with equal rapidity. Placing this at $6,500 would mean that the railways have at least $304,000,000 invested in passenger car equipment alone.

What has been true of the substitution of steel construction and steel under frames in passenger equipment has been going on longer and more steadily in freight cars, until the average cost of freight cars of all classes, equipped with all the modern appliances, is well over $1,000. At this figure the value of the freight cars in the United States at present is easily $2,134,000,000. And so we have the following amounts invested in three items of equipment:

Locomotives	$777,322,000
Passenger cars	304,000,000
Freight cars	2,134,000,000
Total	$3,215,322,000
Per mile of line	13,420

The single item of maintaining the equipment in serviceable condition cost the railways of the United States last year over $407,000,000. Both initial cost and maintenance per unit is costing more each year, for the obvious reason that each unit is undergoing a process of evolution.

EQUIPMENT BY GROUPS.

In the next summary is presented the distribution of railway equipment by territorial groups, as assigned in the report of the Interstate Commerce Commission for the year ending June 30, 1909:

SUMMARY SHOWING DISTRIBUTION BY INTERSTATE COMMERCE COMMISSION GROUPS, *1909*.*

Territory Covered	Locomotives	Passenger Service	Cars Freight Service	Company's Service
Group I	3,252	5,290	82,140	3,768
Group II	13,408	12,336	504,742	17,769
Group III	8,651	5,515	387,039	13,573
Group IV	3,099	2,011	119,333	4,753
Group V	4,673	3,304	170,760	8,646
Group VI	10,402	7,443	422,240	17,724
Group VII	2,111	1,463	63,278	5,827
Group VIII	5,792	3,586	183,938	13,266
Group IX	2,365	1,452	59,566	4,000
Group X	3,459	3,184	80,570	9,364
United States	57,212	45,584	2,073,606	99,090

*Exclusive of equipment of switching and terminal companies.

THE SURPLUS OF FREIGHT CARS.

Ever since the panic of 1907 there has been a surplus of freight cars. That is to say for forty months, from December, 1907, to March, 1911, inclusive, the Committee on Car Efficiency of the American Railway Association has reported that the supply of freight cars exceeded the demand. In the months preceding this period the condition was reversed and the air was filled with denunciation of the railways for failure to provide sufficient freight equipment. The fluctuation in the supply of freight cars is shown in the following statement:

FREIGHT CAR SHORTAGES AND SURPLUS, BY MONTHS, FROM JANUARY, 1907, TO FEBRUARY, 1911.

Month	1907 Shortage	1908 Surplus	1909 Surplus	1910 Surplus	1911 Surplus
January	110,000	342,580	333,019	52,309	110,432
February	150,000	322,513	301,571	51,600	156,355
March	....	297,042	291,418	45,315	208,527
April	100,000	413,605	282,328	84,887	....
May	60,000	404,534	273,890	127,148	....
June	40,000	349,944	262,944	129,508	....
July*	20,000	308,680	243,354	143,824	....
August*	15,000	253,003	159,424	105,564	....
September	60,000	133,792	78,798	54,890	....
October†	90,757	110,912	35,977	33,735	....
November	57,003	132,829	39,528	34,581	....
December (surplus)	209,310	222,077	58,354	53,915	....

*In July and August, 1907, there was a net surplus.

†In October, 1909, the surplus in one section was offset by a shortage in another section.

The surplus reported for March 15, 1911, was the largest since July, 1909.

In the face of a greatly increased traffic in 1910 the surplus of cars was due to two factors, the increased capacity of the cars and greater efficiency in loading. There was also a slight improvement in the average movement of the cars, as is shown in the following statement compiled from the Statistical bulletins of the Committee on Relations between Railroads of the American Railway Association, which, like the statement immediately preceding, covers Canadian as well as American railways:

SUMMARY SHOWING THE AVERAGE PERFORMANCE OF AMERICAN AND CANADIAN FREIGHT CARS DURING THE YEARS ENDING JUNE 30, 1910, AND 1909, AND AVERAGE CAR LOAD IN 1910.

Month	Average Miles per Day per Car		Average Ton Miles per Car per Day		Average Tons per Loaded Car
Year Ending June 30	1910	1909	1910	1909	1910
July	22.0	20.0	309	275	20.7
August	23.2	20.8	340	292	20.9
September	24.3	22.0	367	320	21.2
October	25.6	23.8	394	346	21.2
November	25.4	23.5	405	341	22.4
December	22.2	22.3	342	332	22.2
January	22.2	20.9	347	293	21.7
February	22.8	21.7	376	306	22.7
March	24.8	22.7	384	330	21.6
April	24.0	22.4	340	310	20.9
May	24.1	22.5	349	304	21.2
June	24.5	22.4	362	314	21.7

Throughout the table there is evidence of a marked improvement in the performance of American railway equipment. An increase of 1.6 miles per day in the average movement of freight cars may seem insignificant to the uninitiated, but when multiplied by the millions of cars, both active and idle and in the shops, besides absorbing the days covered by loading, unloading, reporting, placing, etc., it assumes proportions most gratifying to operating officials. Taken in connection with the improved loading, which reached the high record of 22.7 tons per car in February, 1910, it accounts for the record movement of freight in 1910.

The percentage of cars in the shops for the year was 6.27, which means over 130,000 freight cars involuntarily out of commission throughout the year. It is an increasing procession that passes through the repair shops.

SAFETY APPLIANCES.

Practically all American railway equipment is provided with automatic couplers and train brakes, the figures for 1909 being 99.3% with the former and 97.3% with the latter.

Practically none of the equipment of European railways is provided with automatic couplers, and only passenger trains and fast express trains with train brakes.

BLOCK SIGNALS.

It is gratifying to note that the revival in the installation of the block signal system remarked in 1909 was continued through 1910.

At the close of the calendar year the figures compiled by the *Railway Age-Gazette* compared with those published by the Commission for the preceding year were as follows:

System	Single Track Miles	Two or More Tracks Miles	Total 1910 Miles	Total 1909 Miles
Automatic block signals	8,338	9,027	17,365	14,238
Non-automatic block signals	43,340	8,626	51,966	51,520
Total	51,678	17,653	69,331	65,758
Increase	....	....	3,573	....

It will be perceived that 3,127 miles of the 3,573 miles of increase was in the installing of the automatic system, some of which was due to its substitution for the manual.

A great deal of sincere and painstaking work with little of practical progress has marked the third year of the Block Signal and Train Control Board's investigations. During the past year 102 additional devices were presented for examination, making a total of 937 submitted to date, besides 48 modifications or revisions of plans previously submitted for the Board's consideration.

Of this number 819 have been disposed of, leaving 166 cases pending.

Of the plans examined during the year, 91 covered signal and automatic train control devices; 103 related to ties, rails, rail fastenings, switches and other track appliances; 64 were devices relating to the construction and equipment of cars and locomotives, such as couplers, draft rigging, ash pans, headlights, etc.; 30 related to the air-brake system and emergency brakes for cars; 9 were mail-bag catching and delivering devices; 7 were automatic hose connectors and 4 were torpedo placers.

AUTOMATIC DISCIPLINE, NOT AUTOMATIC APPLIANCES NEEDED.

As the result of three years' investigation, the Board arrives at the inevitable finding of disinterested inquiry that "for the safe operation of the manual block system, competent and faithful signalmen are absolutely essential" and that "the block system, both manual and automatic, on most American railways, is operated far below its maximum efficiency."

Out of 149 signal and automatic stop devices examined, the Board has found only 16 purely automatic stop devices worthy of putting to the test of installation and only two are undergoing that test. The Board says, "Experience with automatic stops shows that under proper discipline they perform a moral function in that runners are more careful to heed stop signals when it is certain that disobedience of such signals will be detected."

"It is not to be considered", continues the report, "that the automatic stop, or that any automatic device, will be a panacea for all the faults at present existing in train operation. The question is whether by the introduction of automatic devices the percentage of accidents due to those faults can be reduced.

"It is an unwelcome thought that the fundamental responsibility for the relatively large number of collisions in this country is chargeable to railway officers and employes; not to them because they are more careless or less sensible of their responsibilities than men in other vocations, for that cannot be truthfully said, but simply because they possess the qualities, mental or temperamental, which are the cause of these deplorable results, and which are symptomatic of characteristics common to all who have been reared in a new and rapidly developing country. But sober reflection leads inevitably to the conclusion that, outside of the army and navy, the American is not reared with that discipline which becomes a part of the man and governs his actions mechanically, as it were, rather than as the result of reasoning. Such discipline leads to action as one's first duty without question or reason, and the sense of duty is the one predominating quality which influences the man's every action unconsciously and unfailingly. This conclusion is brought home all the more convincingly when one reflects that NOWHERE IN THE WORLD have appliances for safeguarding railway transportation been so highly developed as in this country, notwithstanding which nowhere in the world is there a greater proportionate number of accidents of the kind which such advance in the art should prevent. The automatic stop, therefore, while it might be unnecessary under different social conditions, may be expected to add to safety in train operation under the conditions which do exist and must continue to exist in this country until we shall come to appreciate and realize all that may be accomplished by discipline of the right sort. But mere discipline will not suffice alone. There must go with it the spirit which prompts obedience for the pleasure of being approved by one's own conscience."

III

EMPLOYES AND THEIR COMPENSATION

NUMBER 1,754,400 **COMPENSATION $1,172,181,000**

The year 1910 will probably mark a turning point in the relation of railway employes and their compensation to the broad question of railway finances and the public service. It practically marks the close of a period of wage advances that are to be traced in great waves through the average per diem compensation of 1903, 1907 and 1910, without any corresponding advances in the average rates that furnish the fund from which that compensation is paid. The Interstate Commerce Commission is struggling with this anomalous and impossible condition as this is written.

* * * * * * * *

The number and compensation of the employes of the railways of the United States for the year 1910 were the largest in their history. For the first time the number exceeded a million and three-quarters and the compensation exceeded a billion dollars by over $172,000,000.

The 364 railway companies reporting to this Bureau on June 30, 1910, had 1,684,238 persons in their employ, against 1,528,808 reported to the Commission for the year 1909, including those employed by switching and terminal companies.

The compensation paid to these employes in 1910 amounted to $1,137,016,508 against $1,005,349,958 reported to the Commission as paid in 1909, inclusive.

As the reports to this Bureau cover 96% of the labor and 97% of the compensation, the total number of persons employed by the railways of the United States in 1910 was approximately 1,754,400, whose compensation was $1,172,181,000.

The average compensation shows an advance from $2.24 per day in 1909 to $2.29 in 1910. It is unfortunate that the Commission does not compute this average, but the data published by this Bureau as to the classes of employes, from which it is compiled, have approached those items in the official averages so closely as to give assurance of its approximate accuracy. As only a part of the advances in wages were operative during the closing months of 1910, an increase of 5 cents per day on an average, foreshadows a heavy pay roll for 1911.

The aggregate number of days worked by the employes of the roads reporting to this Bureau in 1910 was 495,148,779 as compared with 434,328,026 in 1909 and 453,002,228 in 1908. This yields an average of 293 days employment per man during the year—a figure which has little significance, because the number employed is not an average for the year to which the total days worked relates.

The first summary under this title gives the number, compensation and average pay of the several classes of employes of the roads reporting for the year 1910, together with the aggregate reported to the Interstate Commerce Commission for the preceding years:

SUMMARY OF RAILWAY EMPLOYES, COMPENSATION AND RATES OF PAY, PER DAY, BY CLASSES IN 1910, AND AGGREGATES FROM 1889 TO 1910.

1910 (227,525 Miles Represented) Class	Number	Per 100 Miles of Line	Compensation	Average Pay per Day	Per Cent of Gross Receipts
General officers................	3,362	1.5	$16,944,774	$15.57	0.6
Other officers...................	8,876	3.9	19,124,504	6.33	0.7
General office clerks............	75,324	33.1	57,259,104	2.38	2.1
Station agents.................	35,644	15.6	26,242,096	2.13	1.0
Other station men.............	152,464	67.0	88,838,520	1.84	3.3
Enginemen....................	63,608	28.0	90,210,060	4.59	3.3
Firemen.......................	67,371	29.6	55,013,446	2.74	2.0
Conductors....................	47,619	20.9	58,859,966	3.93	2.2
Other trainmen................	135,447	59.5	110,098,592	2.72	4.1
Machinists....................	54,762	24.0	48,031,237	3.07	1.8
Carpenters....................	68,432	30.1	50,363,251	2.51	1.9
Other shopmen................	223,730	98.2	145,131,833	2.18	5.3
Section foremen...............	42,825	18.7	28,531,539	1.99	1.0
Other trackmen...............	375,808	165.2	140,045,607	1.47	5.2
Switch tenders, crossing tenders and watchmen...............	44,809	19.6	25,019,745	1.69	1.0
Telegraph operators and despatchers....................	42,497	18.6	32,302,529	2.33	1.2
Employes account floating equipment........................	10,927	4.8	7,787,854	2.21	.3
All other employes and laborers.	230,733	101.4	137,211,851	2.01	5.0
Total (95% mileage represented)......................	1,684,238	740.0	$1,137,016,508	$ 2.29	42.0
1909 Official figures............	1,528,808	638	$1,005,349,958	(b) $2.24	41.00
1908..........................	1,458,244	632	1,051,632,225	2.25	43.38
1907..........................	1,672,074	735	1,072,386,427	2.20	41.42
1906..........................	1,521,355	684	(a) 930,801,653	2.09	40.02
1905..........................	1,382,196	637	839,944,680	2.07	40.34
1904..........................	1,296,121	611	817,598,810	No data	41.36
1903..........................	1,312,537	639	775,321,415	No data	40.78
1902..........................	1,189,315	594	676,028,592	No data	39.28
1901..........................	1,071,169	548	610,713,701	No data	38.39
1900..........................	1,017,653	529	577,264,841	No data	38.82
1899..........................	928,924	495	522,967,896	No data	39.81
1898..........................	874,558	474	495,055,618	No data	39.70
1897..........................	823,476	449	465,601,581	No data	41.50
1896..........................	826,620	454	468,824,531	No data	40.77
1895..........................	785,034	441	445,508,261	No data	41.44
1894..........................	779,608	444	No data	No data	....
1893..........................	873,602	515	No data	No data	....
1892..........................	821,415	506	No data	No data	....
1891..........................	784,285	486	No data	No data	....
1890..........................	749,301	479	No data	No data	....
1889..........................	704,743	459	No data	No data	....

(a) Includes $30,000,000 estimate pay-roll of Southern Pacific, whose records were destroyed in the San Francisco disaster.

(b) Bureau computations.

Analysis of this table will repay the student. On its face for the year 1910, it deals with the largest labor and compensation totals in the history of American railways, absolutely and relatively to miles of line. Not only so, but it shows that notwithstanding the employment of a quarter of a million more, and therefore inexperienced men, the average compensation per day was five cents higher than last year and 9 cents higher than in 1907.

Nine cents a day does not sound as startling as $1,000,000 a day; but applied to the 495 million and odd days worked by railway employes in 1910, it cost the railways of the United States nearly $45,000,000 without adding the revolution of a wheel to their efficiency.

That nine cents could not have been saved to the railway treasuries without precipitating a strike that would have cost the country many hundreds of millions.

It will also be noticed that labor absorbed 42% of the total earnings from transportation, the highest proportion, except in 1908, on record.

UNREMUNERATIVE EXPENDITURES.

An examination of certain items of the table shows the effect of the multifarious demands of legislatures and commissions in wholly unremunerative increases. The coincidence of mileage reporting to this Bureau for 1910 and the Commission's final figures for 1907 affords an even basis for the following comparisons:

COMPENSATION OF CLASSES ESPECIALLY AFFECTED BY THE DEMANDS OF LEGISLATURES AND COMMISSIONS IN 1910 AND 1907 COMPARED.

Class	1910 227,525 Miles Represented	1907 227,455 Miles Represented
Other officers	$ 19,124,504	$ 15,012,226
General office clerks	57,259,104	48,340,123
Station agents	26,242,196	24,831,066
Telegraph operators and despatchers	32,302,529	29,058,251
Employes account floating equipment	7,787,854	6,035,415
Total	$142,716,187	$123,277,081
Increase over 1907	$ 19,439,106	....

Ten years ago the compensation of these same five classes was only $70,246,396 against $142,716,187 in 1910, making an increase of over 100% for the decade where there was an increase of only 18% in mileage and only 28% in the compensation of general officers. Except for the unremunerative demands of regulation, the compensation of these classes would not have advanced more than 50%—and the pity of it is that 50% of the labor entailed on these classes contributes nothing either to the efficiency of the railways or the publicity which is the excuse for the unproductive labor.

Average Daily Compensation 1910-1892.

Since 1892 the Commission has published tables giving the average daily compensation of railway employes, being careful to state that the arbitrary rules by which compensation is converted into a daily wage are not altogether satisfactory. They are the best, however, that it has been possible to devise and being uniform afford a settled basis for comparison from year to year.

In order to present the result of this important summary in a single table, it has been found necessary to reverse the style of its tabulation—placing the eighteen classes of employes at the head of the columns and the years at the side. The departure promises to be an improvement when the eye becomes accustomed to the change:

Comparative Summary of Average Daily Compensation of Railway Employes, by Classes, for the Years Ending June 13, 1910 to 1892.

	General Officers	Other Officers	General Office Clerks	Station Agents	Other Stationmen	Enginemen	Firemen	Conductors	Other Trainmen	Machinists	Carpenters	Other Shopmen	Section Foremen	Other Trackmen	Switchmen, Flagmen and Watchmen	Telegraph Operators and Despatchers	Employes Account Floating Equipment	All Other Employes and Laborers
1910* Bureau.......	15.57	6.33	2.38	2.13	1.84	4.59	2.74	3.93	2.72	3.07	2.51	2.18	1.99	1.47	1.69	2.33	2.21	2.01
1909† Official.......	12.67	6.40	2.31	2.08	1.82	4.44	2.67	3.81	2.59	2.98	2.43	2.13	1.96	1.38	1.73	2.30	2.31	1.98
1908† “	13.11	6.27	2.33	2.09	1.82	4.45	2.64	3.81	2.60	2.95	2.40	2.12	1.95	1.45	1.78	2.30	2.38	1.97
1907 “	11.93	5.99	2.30	2.05	1.78	4.30	2.54	3.69	2.54	2.87	2.40	2.06	1.90	1.46	1.87	2.26	2.27	1.92
1906 “	11.81	5.82	2.24	1.94	1.69	4.12	2.42	3.51	2.35	2.69	2.28	1.92	1.80	1.36	1.80	2.13	2.10	1.83
1905 “	11.74	6.02	2.24	1.93	1.71	4.12	2.38	3.50	2.31	2.65	2.25	1.92	1.79	1.32	1.79	2.19	2.17	1.83
1904 “	11.61	6.07	2.22	1.93	1.69	4.10	2.35	3.50	2.27	2.61	2.26	1.91	1.78	1.33	1.77	2.15	2.17	1.82
1903 “	11.27	5.76	2.21	1.87	1.64	4.01	2.28	3.38	2.17	2.50	2.19	1.86	1.78	1.31	1.76	2.08	2.11	1.77
1902 “	11.17	5.60	2.18	1.80	1.61	3.84	2.20	3.21	2.04	2.36	2.08	1.78	1.72	1.25	1.77	2.01	2.00	1.71
1901 “	10.97	5.56	2.19	1.77	1.59	3.78	2.16	3.17	2.00	2.32	2.06	1.75	1.71	1.23	1.74	1.98	1.97	1.69
1900 “	10.45	5.22	2.19	1.75	1.60	3.75	2.14	3.17	1.96	2.30	2.04	1.73	1.68	1.22	1.80	1.96	1.92	1.71
1899 “	10.03	5.18	2.20	1.74	1.60	3.72	2.10	3.13	1.94	2.29	2.03	1.72	1.68	1.18	1.77	1.93	1.89	1.68
1898 “	9.73	5.21	2.25	1.73	1.61	3.72	2.09	3.13	1.95	2.28	2.02	1.70	1.69	1.16	1.74	1.92	1.89	1.67
1897 “	9.54	5.12	2.18	1.73	1.62	3.65	2.05	3.07	1.90	2.23	2.01	1.71	1.70	1.16	1.72	1.90	1.86	1.64
1896 “	9.19	5.96	2.21	1.73	1.62	3.65	2.06	3.05	1.90	2.26	2.03	1.69	1.70	1.17	1.74	1.93	1.94	1.65
1895 “	9.01	5.85	2.19	1.74	1.62	3.65	2.05	3.04	1.90	2.22	2.03	1.70	1.70	1.17	1.75	1.98	1.91	1.65
1894 “	9.71	5.75	2.34	1.75	1.63	3.61	2.03	3.04	1.89	2.21	2.02	1.69	1.71	1.18	1.75	1.93	1.97	1.65
1893 “	......	7.84	2.23	1.83	1.65	3.66	2.04	3.08	1.91	2.33	2.11	1.75	1.75	1.22	1.80	1.97	1.96	1.70
1892 “	......	7.62	2.20	1.81	1.68	3.68	2.07	3.07	1.89	2.29	2.08	1.71	1.76	1.22	1.78	1.93	2.07	1.67

*Pay of general officers in 1910 out of proportion because Bureau returns do not cover hundreds of small roads.

†Averages for 1909 and 1908 do not include returns for switching and terminal companies.

It will be observed that there was no such decline in the average compensation after the business depression of 1907–08 as followed the panic of 1893, as shown in this table. That it was not more marked then drew from the Official Statistician the following comment:

"It may be an occasion for surprise that the commercial depression of the year 1894 did not cause a more marked decrease in the average compensation of employes. This is doubtless explained by the decrease in the number of men employed. The saving in the pay roll was achieved by the reduction in employes rather than the reduction in wages."

The same general policy was pursued in 1908, when no decrease at all in average compensation is perceptible, for the sufficient reason that the advance of 1907 was not wholly operative until 1908.

Such exceptional decreases for 1910 as appear in the table are due to the reclassification of some employes. This is noticeable in the classes of "Other officers" and "Switchmen, flagmen and watchmen."

From the low record of averages of this table in 1894 to the high record in 1910, it will be found that the average daily compensation of enginemen increased 27.1%; of firemen, 35%; of conductors, 29.2%; and of other trainmen 43.9%. The increase for all classes was approximately 26%.

The ratio of the compensation of all employes to the gross earnings and total operating expenses together with the ratio of the latter to the former for the years 1910 to 1895 is given in the following table:

SUMMARY SHOWING PROPORTION OF COMPENSATION OF EMPLOYES TO GROSS EARNINGS AND OPERATING EXPENSES, AND OF OPERATING RATIO FOR SIXTEEN YEARS, 1910 TO 1895.

	Ratio Compensation of Labor to Gross Earnings	Ratio Compensation of Labor to Operating Expenses	Ratio of Operating Expenses to Gross Earnings
1910	42.00%	63.41%	66.27%
1909	41.00%	62.06%	66.12%
1908	43.38%	62.33%	69.67%
1907	41.42%	61.41%	67.53%
1906	40.02%	60.79%	66.08%
1905	40.34%	60.40%	66.78%
1904	41.36%	61.07%	67.79%
1903	40.78%	61.65%	66.16%
1902	39.28%	60.58%	64.66%
1901	38.39%	59.27%	64.86%
1900	38.82%	60.04%	64.65%
1899	39.81%	61.04%	65.24%
1898	39.70%	60.52%	65.58%
1897	41.50%	61.87%	67.06%
1896	40.77%	60.39%	67.20%
1895	41.44%	61.38%	67.48%

This table demonstrates that the vast expenditures for the improvement of the physical means of transportation in the United States—all the reducing of grades, rectification of curves, strengthening of way, increase in power and capacity of equipment, installation of safety and labor saving devices—have not dislodged labor from its dominating relation to the railways of the United States. Capital has provided the means in powerful locomotives and enormous trains on solidified tracks for the movement of unparalleled traffic at low rates without reducing the first mortgage lien of labor upon the revenues.

The third column shows how closely the ratio of expenses to earnings follows the ratio of the pay rolls to the revenues from operation.

NUMBER AND COMPENSATION OF FOREIGN RAILWAY EMPLOYES.

While the statistics of foreign railways relating to the number and compensation of their employes, compared to ours, are incomplete, they suffice to afford a striking contrast.

According to the latest "census" of British railway "servants" taken in 1907, they numbered 621,341 and their compensation last year amounted, as near as can be ascertained from the Board of Trade reports, to $156,225,173, or $251 per man per year, against an average of $668 per man in the United States.

It is a remarkable example of the conservative character of railway operation in the United Kingdom that the pay rolls of the principal companies from which these figures are compiled aggregated $26,963,675 in 1909 and $26,967,764 in 1908—a difference of only fifteen-thousandths of one per cent.

The number and average weekly pay of the principal classes of British railway servants in 1909 were as follows:

Class	Number	Pay per Week
Engine drivers	28,141	$7.00 to $10.00
Firemen	25,714	5.00 " 7.00
Passenger guards	8,474	5.25 " 6.50
Goods guards and brakesmen	16,786	5.25 " 7.75
Permanent way men	67,184	No data
Mechanics and artisans (men)	83,593	" "
(boys)	10,204	" "
Engine cleaners (men)	16,714	$2.50 to $4.80
(boys)	5,098	....
Shunters	13,158	4.50 to 5.50
Signal men	28,658	4.30 " 5.10
Porters (men)	51,707	4.30 " 5.10
(boys)	4,695	....
Clerks (men)	58,503	No data
(boys)	10,672	....

According to returns to the British Board of Trade covering 459,444 railway servants, their pay for a selected week in 1909, amounted to £582,782, an average of 25s. 4½d., or $6.08, per week each. This would make an average of $317 per year. The discrepancy of $66 between this and that given above is accounted for by the inclusion of boys in the pay rolls yielding the smaller average.

The considerable number of boys included in the census of British railway servants must have been remarked. No less than 45,780 were included in the enumeration of 1907.

EMPLOYES OF GERMAN RAILWAYS.

The number and pay of the employes of the railways of the German Empire, including state and private roads, distributed among the four main classes into which they are divided, for the year ending December 31, 1909, were as follows:

SUMMARY SHOWING NUMBER AND PAY OF GERMAN RAILWAY EMPLOYES FOR THE YEAR ENDING DECEMBER 31, 1909.

Division	Employes Number	Compensation (Total)	Average per Year	Increase over 1907
General administration.................	32,322	$ 26,971,250	$837	$50
Maintenance and guarding road.........	173,065	41,961,380	243	2
Station service and train crews.........	298,208	120,285,380	403	19
Switching crews and shops.............	187,492	74,829,650	399	(d) 3
Total.............................	691,087	$264,047,660	$382	$11
Increase over 1908.................	(d) 8068	4,440,926	11	

(d) Decrease.

Recent advances in the pay of German railway employes, combined with heavy borrowings to replace worn out and antiquated equipment, have had the effect of reducing the net revenues from 6.35% on cost of construction in 1906 to 5.09% in 1909.

DAILY EARNINGS OF PRUSSIAN RAILWAY EMPLOYES.

Bulletin No. 88 of the Bureau of Labor (May, 1910), gives the following table showing "the total compensation, including the various extras customary to railway employes, in the way of travel allowances, etc., of the classes of workers employed in the service of the Prussian-Hessian state railway system" for a decade:

Average Daily Earnings of Employes of the Prussian-Hessian State Railway System, 1898 to 1907.

Actual Earnings.

Class of Employes	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Technical office employes, draftsmen, etc.	$1.49	$1.53	$1.60	$1.64	$1.67	$1.71	$1.73	$1.72	(a)	(a)
Employes engaged on inside work	.72	.73	.73	.73	.73	.76	.77	.77	$0.79	$0.83
Employes engaged in station work, freight handlers, etc.	.60	.61	.63	.64	.64	.64	.65	.67	.69	.72
Track walkers, section hands, clerks for foremen, etc.	.45	.48	.50	.51	.51	.51	.52	.53	.56	.60
Engineers, conductors, etc., clerks for operation service	.61	.62	.62	.63	.63	.64	.64	.65	.68	.70
Other train service men	.50	.51	.53	.54	.55	.55	.56	.58	.61	.64
Workmen engaged on inside work	.62	.64	.64	.64	.65	.66	.67	.68	.72	.76
Workmen engaged in train operation	.58	.60	.62	.63	.64	.64	.66	.68	.72	.75
Maintenance of way employes	.51	.52	.54	.55	.55	.55	.56	.57	.60	.63
Shop workers of the lower grades	.68	.69	.70	.70	.71	.72	.74	.76	.80	.86
Shop workers of the higher grades	.99	.98	1.00	1.01	1.03	1.02	1.02	1.05	1.05	1.09
Artisans and mechanics, time rates	.79	.79	.82	.83	.84	.85	.87	.90	.95	.98
Artisans and mechanics, piece rates	.98	.99	1.00	.98	.98	.99	.99	1.01	1.06	1.09
Skilled workers on shop work, time rates	.64	.64	.66	.70	.70	.72	.74	.78	.82	.86
Skilled workers on shop work, piece rates	.86	.86	.88	.87	.87	.88	.89	.92	.98	1.02
Other shopmen, time rates	.60	.61	.63	.64	.64	.66	.67	.69	.73	.75
Other shopmen, piece rates	.80	.81	.82	.81	.82	.83	.83	.84	.88	.91
Apprentices (shop workers)	.26	.25	.26	.26	.26	.26	.26	.25	.26	.26
Average for all employes	$0.61	$0.63	$0.65	$0.65	$0.66	$0.66	$0.67	$0.69	$0.73	$0.76

(a) Not reported.

It is apparent at a glance that this table is confined to grades below officials in the general administration and operating departments, for the highest average in the table would not yield the average found in the official German reports. It is interesting, however, as showing the rates of pay of certain classes of railway employes.

Employes of French Railways.

The official statistics of French railways give the number but not the compensation of their employes, except for the department of traction and material. The figures for the calendar years 1908 and 1906 were as follows:

	1906	1908
General administration	3,119	3,187
Transportation and traffic	128,823	144,060
Traction and material	80,732	90,924
Way and structures	81,897	86,421
Auxiliaries	82,809	87,712
Female employes	29,178	30,486
Total	406,558	442,790

In the department of "traction et material" the compensation of employes was 88,382,654 francs, approximately $17,060,000 or $187.50 per employe per year.

EMPLOYES OF AUSTRIAN RAILWAYS.

In the working of 13,500 miles of line in 1908, the railways of Austria employed 274,987 persons, whose number and compensation divided among five classes were as follows:

	Number Employes	Total Compensation	Average per Year
Appointed staff:			
1. Officers	21,411	$15,711,565	$734
2. Under officers	20,639	10,100,573	489
Women officers	2,552	491,997	193
3. Regular employes	76,654	21,339,401	278
Laborers for daily pay	153,731	23,712,059	154
Total	274,987	$71,355,596	$260

The scheme of compensation of Austrian railway employes is complicated by a system of allowances of more than half a dozen different kinds. The pay of engine drivers, and allowances, run all the way from $240 for the first year to $560 as the maximum reached in the ninth year. His dwelling allowance is graded according to years of service and the class of town where he lives, computed by classes from Vienna down. In the first year in the lowest class of town his dwelling allowance is $40 a year, from which it ranges up to $160 in Vienna in the ninth year of service.

The pay of firemen ranges from $160 up to $320 in the ninth year with dwelling allowances from $60 up to $120, according to service and location.

The railway staff in Austria is divided as above, the official class (beamte) being subdivided as numbered; Number 1 are those officials who have served as active officers in the army or navy, have graduated at a university or passed the necessary civil service examination; Number 2, are those who have been educated at recognized public or grammar schools; and Number 3, (Diener) are those officials who have been educated at elementary schools. It will be observed that the classification line is an educational one.

EMPLOYES OF RUSSIAN RAILWAYS.

In 1907 there were 836,035 persons in the employ of Russian railways, including those of Siberia, whose compensation amounted to $169,842,700, or $203 each per year. In Russia the railway staff is divided between official and regular employes and day laborers, and these again are subdivided among central administration, local general officers, maintenance and guarding track, telegraph and traffic service, and train service, as near as our equivalents can follow the divisions.

In 1907 the number and compensation of Russian Railway employes divided between those in Europe and Asia and the private companies were as follows:

	Number	Compensation	Average per Year
Russia in Europe:			
Officials and regular staff	302,287	$66,341,090	$219
Day laborers	214,143	34,407,150	161
Russia in Asia:			
Officials and regular staff	57,762	20,438,805	353
Day laborers	45,753	9,040,310	199
Private companies:			
Officials and regular staff	129,527	27,624,085	212
Day laborers	86,563	11,991,260	139
Total	836,035	$169,842,700	$203

In the comparatively high pay of the staff in Russian Asia will be found one of the reasons why the Siberian roads fail to earn operating expenses. In 1907 the ratio of expense to revenues was 126%, and this was the lowest it has ever been.

EMPLOYES OF SWISS RAILWAYS.

In Switzerland, which affords as good an example of state managed railways as is to be found on the continent of Europe, the number and compensation of railway employes for the year 1907 were as follows:

NUMBER AND PAY OF SWISS RAILWAY EMPLOYES BY PRINCIPAL DIVISIONS IN 1907.

Division	Employes Number	Compensation (Total)	Average per Year
General administration	1,631	$ 780,715	$478
Maintenance and inspection of way	10,308	1,459,977	142
Transportation and train service	17,815	6,829,426	383
Porters and laborers	12,219	3,209,810	262
Total	41,973	$12,279,928	$292

Only 31.9 per cent of the gross earnings of Swiss railways goes to labor, therefore the financial embarrassment attending their operation has to be sought elsewhere.

In 1908 the number of Swiss railway employes showed a slight decrease to 41,930. The figures for their compensation are not available, but the reported increase in their compensation is reflected in the advance in the ratio of expenses to revenues from 67.29% in 1907 to 71.37% in 1908.

RECAPITULATION OF EUROPEAN RAILWAY LABOR.

The true bearing of these foreign railway labor statistics might be missed unless they were assembled in such shape as to be readily comparable with our own. This is done in the following statement:

SUMMARY SHOWING NUMBER OF EMPLOYES, COMPENSATION AND AVERAGE YEARLY PAY OF THE PRINCIPAL EUROPEAN COUNTRIES.

	Miles of Railway	Employes Number	Compensation per Year	Average per Year
United Kingdom (1909)	23,280	621,341	$156,225,173	$251
German Empire (1909)	36,235	691,087	264,047,660	382
Austria (1908)	13,500	274,987	71,355,596	260
Hungary (1908)	12,177	123,477	32,452,871	263
Russian Empire (1907)	40,392	836,035	169,842,700	203
France (1908)	24,915	442,790	*115,125,400	260
Italy (state) (1907)	8,762	127,372	36,462,071	287
Switzerland (1907)	2,740	41,973	12,279,928	292
Total	161,324	3,167,230	$853,350,473	$269
Rest of Europe, estimated	35,199	†703,980	†183,034,800	260
Total Europe and Siberia	197,210	3,863,142	$1,040,726,199	$269
United States (1910)	239,652	1,754,400	$1,172,181,000	$668

*Estimated on an average of $260 per employe, probably high.

†Number of employes estimated at 20 per mile of line. In Belgium the ratio is over 25, but the same proportion does not hold in the Scandinavian countries or on the Spanish peninsula, although approached in Holland. The compensation is estimated at $260 per annum, which is liberal, considering the railway wages in these countries average the lowest in Europe.

Comment on this table is unnecessary, beyond remarking that with more than double the number of employes the railways of Europe and Siberia pay a hundred and thirty-five million less to their employes than do the railways of the United States.

THE COST OF LIVING.

While there has been no governmental report on the retail prices of food since Bulletin No. 77 of the Bureau of Labor brought the data down to 1907, Bulletin No. 87 brings the data on wholesale prices down to March, 1910, and confirms the computations made for this report last year and reproduced herewith:

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES, 1890 TO 1909.

(Average price for 1890-1899=100.0.)

Year	Apples, Evaporated	Beans, Dry	Beef, Fresh, Roasts	Beef, Fresh, Steaks	Beef, Salt	Bread, Wheat	Butter	Cheese	Chickens (year or more old), Dressed	Coffee
1890	109.0	103.3	99.5	98.8	97.5	100.3	99.2	98.8	101.3	105.4
1891	110.3	106.2	100.0	99.4	98.3	100.3	106.4	100.3	104.0	105.2
1892	99.3	102.4	99.6	99.3	99.5	100.3	106.8	101.5	103.8	103.8
1893	107.0	105.0	99.0	99.6	100.3	100.1	109.9	101.8	104.2	104.8
1894	105.8	102.8	98.3	98.2	98.9	99.9	101.7	101.6	98.6	103.3
1895	97.4	100.5	98.6	99.1	99.6	99.7	97.0	99.2	98.4	101.7
1896	88.6	92.7	99.1	99.5	99.8	99.9	92.7	97.9	97.1	99.6
1897	87.8	91.5	100.3	100.2	100.9	100.0	93.1	99.0	94.0	94.6
1898	95.4	95.9	101.7	102.0	102.1	99.8	95.1	97.5	96.8	91.1
1899	99.5	99.7	103.7	103.9	103.2	99.6	97.7	102.4	101.8	90.5
1900	95.2	110.0	106.5	106.4	103.7	99.7	101.4	103.9	100.8	91.1
1901	96.8	113.9	110.7	111.0	106.1	99.4	103.2	103.3	103.0	90.7
1902	104.4	116.8	118.6	118.5	116.0	99.4	111.5	107.3	113.2	89.6
1903	100.8	118.1	113.1	112.9	108.8	100.2	110.8	109.4	113.5	89.3
1904	99.2	116.8	112.8	113.4	108.3	103.9	109.0	107.4	120.7	91.8
1905	106.0	116.3	112.2	112.9	107.9	104.5	112.7	110.9	123.6	93.6
1906	115.6	115.2	115.7	116.5	110.8	102.3	118.2	115.5	129.1	94.7
1907	124.6	118.8	119.1	120.6	114.1	104.5	127.6	123.2	131.4	95.0
1908	126.4	138.9	126.2	131.5	116.4	124.5	123.5	121.3	128.6	94.7
1909	128.6	141.2	132.6	134.1	128.2	124.5	134.8	142.0	150.2	108.6

Year	Corn Meal	Eggs	Fish, Fresh	Fish, Salt	Flour, Wheat	Lard	Milk, Fresh, unskimmed	Molasses	Mutton	Pork, Fresh
1890	100.0	100.6	99.3	100.7	109.7	98.2	100.5	104.7	100.7	97.0
1891	109.7	106.9	99.6	101.7	112.5	99.8	100.5	101.7	100.6	98.7
1892	105.2	106.8	100.1	102.2	105.1	103.6	100.6	101.2	101.0	100.5
1893	103.1	108.1	100.1	103.4	96.1	117.9	100.4	100.6	99.9	107.0
1894	102.2	96.3	100.4	101.5	88.7	106.9	100.2	100.3	97.8	101.8
1895	100.8	99.3	99.8	98.9	89.0	100.1	100.0	99.0	98.7	99.7
1896	95.0	92.8	100.2	97.5	92.7	92.5	99.9	98.7	98.7	97.4
1897	93.7	91.4	99.8	95.2	104.3	89.8	99.7	97.7	99.6	97.6
1898	95.0	96.2	100.5	98.8	107.4	93.9	99.4	97.9	100.4	98.
1899	95.1	101.1	100.2	100.2	94.6	97.1	98.9	98.2	102.6	101.7
1900	97.4	99.9	100.4	99.1	94.3	104.4	99.9	102.2	105.6	107.7
1901	107.1	105.7	101.4	100.9	94.4	118.1	101.1	101.3	109.0	117.
1902	118.8	119.1	105.0	102.8	94.9	134.3	103.3	102.1	114.7	128.
1903	120.7	125.3	107.3	108.4	101.2	126.7	105.8	103.8	112.6	127.
1904	121.5	130.9	107.9	111.7	119.9	117.3	106.3	104.0	114.1	124.
1905	122.2	131.6	109.9	113.8	119.9	116.6	107.0	104.4	117.8	126.
1906	123.2	134.2	116.2	116.8	180.1	128.0	108.9	105.3	124.1	137.
1907	131.6	137.7	120.6	121.6	117.7	134.2	116.8	107.7	130.1	142.
1908	154.0	140.2	116.2	118.4	140.0	132.1	115.4	102.2	126.4	141.
1909	160	142.2	120.4	122.6	154.4	153.8	141.6	106.4	134.8	168.

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES, 1890 TO 1909 —Continued.

(Average price for 1890-1899=100.0.)

Year	Pork, Salt, Bacon	Pork, Salt, Dry or Pickled	Pork, Salt, Ham	Potatoes, Irish	Prunes	Rice	Sugar	Tea	Veal	Vinegar
1890............	95.8	95.3	98.7	109.3	116.8	101.3	118.6	100.0	98.8	102.9
1891............	96.6	98.9	99.3	116.6	116.5	102.5	102.7	100.4	99.6	105.5
1892............	99.1	100.5	101.9	95.7	113.5	101.3	96.2	100.2	100.0	102.7
1893............	109.0	108.7	109.3	112.3	115.6	98.4	101.5	100.1	100.0	99.5
1894............	103.6	103.4	101.9	102.6	100.9	99.0	93.8	98.7	98.7	99.8
1895............	99.4	99.2	98.8	91.8	94.2	98.8	91.8	98.5	98.5	98.9
1896............	96.7	95.5	97.6	77.0	86.8	96.7	96.6	98.8	99.5	97.2
1897............	97.4	97.3	98.2	93.0	84.3	97.9	95.7	98.5	99.9	97.4
1898............	100.2	99.1	95.1	105.4	86.3	101.7	101.3	100.7	101.2	97.9
1899............	102.9	101.8	99.2	96.1	85.1	102.4	101.7	104.4	103.7	98.3
1900............	109.7	107.7	105.3	93.5	83.0	102.4	104.9	105.5	104.9	98.5
1901............	121.0	117.5	110.2	116.8	82.6	103.5	103.0	106.7	108.8	98.9
1902............	135.6	132.5	119.4	117.0	83.4	103.5	96.0	107.2	115.2	99.5
1903............	139.8	129.0	121.3	114.8	80.2	103.9	96.1	106.0	114.9	99.1
1904............	137.9	125.8	118.4	121.3	79.6	101.6	101.9	105.8	115.5	98.9
1905............	138.8	126.0	118.5	110.2	81.4	102.6	103.9	105.7	117.7	100.3
1906............	150.4	136.9	127.2	114.4	85.1	105.7	98.2	105.5	123.2	102.6
1907............	157.3	141.2	130.7	120.6	88.4	108.5	99.6	105.3	125.0	104.5
1908............	142.4	137.4	112.0	138.4	......	105.1	100.0	108.6	124.2	112.4
1909............	180.0	151.2	145.0	120.0	......	103.3	105.0	109.0	130.2	113.0

No authority is claimed for the prices in these tables for the years 1908 and 1909. They merely represent the tendencies in those years, as found in official and unofficial wholesale prices of the several commodities, and there are often striking divergences between wholesale and retail prices over short periods.

Bulletin No. 87 shows that the relative wholesale prices of all commodities, after receding a few points in 1908 from the high record of 1907, turned again in 1909 and moved steadily upward until they reached the highest level covered by the report in March, 1910, or 33.8 points above the average price 1890–1899=100, which is the base for all these computations.

In the particular items entering into the family cost of living, food touched the top figure, 130.9, in March, 1910, cloths and clothing 126.9 in February of the same year, while fuel and lighting shaded off from 135 in 1907 to 130.3 in March, 1910. It might be noted that fuel reached its high point back in 1903 when it averaged 149.3 for the year.

Taking up the wholesale prices where Bulletin No. 87 leaves them, *Bradstreets* price index numbers bring them down to date as follows:

1910		1910	
April	9.1996	November	8.8766
May	9.0385	December	8.7844
June	8.9105		
July	8.9246	1911	
August	8.8222		
September	8.9519	January	8.8361
October	8.9267	February	8.7662

It is perhaps worthy of note that the average for 1910 was considerably higher than for the year 1907.

In January, 1910, when the average of all commodities was at the highest, *Bradstreets* price index number for provisions stood at 2.3577; by January 1, 1911, it had fallen to 2.2697 and by February 1st to 2.1525. The chief factor in this decline has been the drop in butter and eggs.

IV

CAPITALIZATION

In its report on the Intercorporate Relations of Railways dated March 10, 1908, the Commission for the first time publicly recognized that the net securities outstanding in the hands of the public measured the claim of railway capital on railway revenues. This admission was couched in the following terms:

"If, however, the problem be to state the amount of securities which are an actual or a contingent claim upon the revenues of the railways of the country considered as a whole, it is evident that the phrase 'in the hands of the public' *must exclude from outstanding capital all railway holdings.* This has been done by the present investigation, and *results in a reduction of the amount which general discussions have heretofore accepted as measuring the claim of railway securities on railway revenues from $67,936 per mile of line to $58,050 per mile of line. The statistical reports issued from this office have never before ventured to publish this net figure, but have contented themselves with stating the amount of stocks and bonds reported by the carriers as outstanding, and the amount of railway securities reported as owned by railway corporations,* and have designated the difference between these two amounts as the amount not owned by railway corporations. It was not possible to say, nor have the reports ever undertaken to say, that this latter amount represented the railway capital in the hands of the public, for the reason that there was no assurance that the amount of securities reported by the carriers as owned was included in the amount reported by other carriers as outstanding. *This report makes public for the first time a correct statement of the portion of securities outstanding in the hands of the public.*"

In its report for the year ending June 30, 1909, after giving the total of railway capital at that date as $17,487,868,935, $3,573,566,572 was reported as held by railway corporations. Excluding from the remainder $202,434,630 "as assigned to properties other than railways", left $13,711,867,733, equivalent to $59,259 per mile of line" as the "figure which measures the amount of railway securities in the hands of individuals and corporations other than railway corporations."

NET CAPITALIZATION IN 1910.

With this warrant for the formula to ascertain the only capitalization that, in official language, "measures the claim of railway securities on railway revenues", the returns received by this Bureau from 227,525 miles of operated line yield the following result for the year ending June 30, 1910:

SUMMARY SHOWING NET CAPITALIZATION OF 362 COMPANIES OPERATING 227,525 MILES OF LINE FOR THE YEAR ENDING JUNE 30, 1910.

	Capitalization 1910 188,169 Miles Owned	
Capital stock	$6,644,019,846	
Funded debt	8,865,677,002	
Receivers' certificates	18,164,434	$15,527,861,282
Rental of 39,356 miles, $129,365,696 capitalized at 5%		2,587,313,920
Total		$18,115,175,202
Deduct:		
Railway stocks owned	$2,890,704,036	
Funded debt owned	1,513,900,995	$4,404,605,031
Net capitalization 1910 (227,525 miles)		$13,710,570,171
Net capitalization per mile operated		60,260

In order to get at the net capitalization of all the railways of the United States a sum equal to $30,000 per mile for the 12,127 miles of line not reporting to this Bureau, or $363,810,000 should be added to the above net capitalization, and $202,000,000, assigned to properties other than railways should be deducted, thus arriving at the following statement of the capital of the railways having a claim on railway revenues in 1910:

Net capitalization 239,652 miles operated line 1910	$13,872,380,171
Net capitalization per mile of line	58,316
Net capitalization per mile of track	40,860

It is a question whether this capitalization should not be further reduced by excluding therefrom the cost of stocks and bonds of other than railway corporations, amounting to nearly $500,000,000 ($496,402,038) held in railway treasuries, and presumably worth what they cost.

It will be noted that the amount per mile of line arrived at through the above computation is only $266 in excess of that for 1906 arrived at by the Commission as the result of its exhaustive inquiries in 1908 into the Intercorporate Relations of Railways.

That the deductions on account of railway stock and funded debt owned are not excessive is proved by the fact that the railway companies involved received no less than $253,014,167 "other income" during the year 1910, of which over $200,000,000 was dividends and interest on such securities.

The following statement gives a clear exposition of the progressive growth of railway capitalization since 1889, together with the steady increase in the amount of railway securities owned by the railways, reducing the net capital outstanding in the hands of the public to the figures in the third column; with the exception of the returns for 1910 these figures are all from the official reports.

SUMMARY OF GROSS RAILWAY CAPITAL, AMOUNT OF RAILWAY SECURITIES OWNED AND NET CAPITALIZATION OF THE RAILWAYS OF THE UNITED STATES, 1910 TO 1889.

Year	Gross Railway Capital	Railway Securities Owned	Net Railway Capital	Net Railway Capital per Mile
1910*	$18,115,175,202	$4,404,605,031	$13,710,570,171	$60,260
1909	17,487,868,935	† 3,776,001,202	13,711,867,733	59,259
1908	16,767,544,827	3,933,953,317	12,833,591,510	57,201
1907	16,082,146,683	3,161,794,135	12,920,352,548	58,298
1906	14,570,421,478	2,898,480,829	11,671,940,649	54,421
1905	13,805,258,121	2,638,152,129	11,167,105,992	53,328
1904	13,213,124,679	2,501,330,601	10,711,794,078	52,099
1903	12,599,990,258	2,318,391,953	10,281,598,305	51,559
1902	12,134,182,964	2,208,518,793	9,925,664,171	50,961
1901	11,688,147,091	2,205,497,909	9,482,649,182	49,925
1900	11,491,034,960	1,943,050,349	9,547,984,611	51,092
1899	11,033,954,898	1,601,913,167	9,432,041,731	51,215
1898	10,818,554,031	1,521,386,255	9,297,167,776	51,856
1897	10,635,008,074	1,466,936,176	9,168,071,898	51,396
1896	10,566,865,771	1,501,346,914	9,065,518,857	51,141
1895	10,346,754,229	1,447,181,534	8,899,572,695	51,421
1894	10,190,658,678	1,544,058,670	8,646,600,008	50,358
1893	9,894,625,239	1,563,022,233	8,331,603,006	50,293
1892	9,686,146,813	1,391,457,053	8,294,689,760	52,348
1891	9,290,915,439	1,282,925,716	8,007,989,723	50,858
1890	8,984,234,616	1,406,907,001	7,577,327,615	49,473
1889	8,574,046,742	1,151,972,901	7,422,073,841	....

*188,169 miles owned represented, and rental paid on 39,356 miles capitalized on 5% basis.

†If railway securities owned in 1908 is correct, the amount for 1909 is about $300,000,000 below what it should be.

Speaking of the capital assignment of $58,298 per mile of line in 1907, the official statistician, presumably with the approval of the Commission, used these words. "This figure represents correctly the average capitalization per mile of the railways in the United States, *meaning by that phrase the amount of active capital to be supported by freight and passenger rates.*"

In 1906, the Commission published a table which showed that the stocks and bonds owned by railways amounted to $3,299,894,045, being $401,413,216 more than the figure given in the preceding table. This was the amount of stocks and bonds other than railway securities owned that year. That item, as above noted, in 1910, involved an investment of $496,402,038.

In 1909, railway capital was distributed among the territorial groups as shown in the next summary:

SUMMARY OF RAILWAY CAPITAL ON JUNE 30, 1909, BY GROUPS.

Territory Covered	Total Railway Capital
Group I	$ 770,088,583
Group II	3,422,797,720
Group III	2,308,544,800
Group IV	949,422,537
Group V	1,315,678,613
Group VI	2,992,909,580
Group VII	834,477,407
Group VIII	2,180,649,942
Group IX	766,150,296
Group X	1,947,149,459
Total	$17,487,868,935
Stocks and bonds owned	3,776,001,202
Net railway capital	$13,711,867,733

As shown by a statement published in the report for 1906, the largest amount of duplication of capital absolutely and relatively was in Group X, where the railway capital was $1,408,095,697, and the railway securities owned amounted to $623,801,333.

NEW RAILWAY CAPITAL IN 1910.

According to the financial papers, the railway securities listed on the New York stock exchange during the calendar year 1910 amounted to $805,833,160. Of these $444,167,700 were in the form of bonds and $361,665,460 were stock.

Of the bonds, $95,534,000 were for the retirement or extension of old bonds and $39,756,000 were old bonds just listed, thus leaving $308,877,700 to represent the new indebtedness listed to take care of new construction, additions, extensions, betterments and new equipment.

Of the stock listed, $30,000,000 was Canadian Pacific; $40,334,000 was old stock just listed; $86,966,615 was to pay notes and other indebtedness; $38,823,230 was to retire bonds; $18,480,700 was in exchange for convertible bonds and $28,288,400 was issued in connection with the reorganization of the Pere Marquette, making a total of $242,902,945 stock listed without adding to the liabilities of the railways and leaving only $118,762,515 for funds to take care of new construction, extensions, improvements, betterments and new equipment.

This would make a total of $427,640,215 to represent the demands on new capital to provide for the extension and improvement of American railway facilities—beyond the millions that percolate into road and equipment through the maintenance departments in the year's work.

It may be noted that none of the bonds listed bore less than 4% and some carried 5% without bringing a premium. When the City of New York, with real estate valued at $7,044,000,000 can only sell 4¼% bonds at a premium that yields $4.15 the financial condition of railways has to be very solid to enable them to borrow for current needs at 5%.

CAPITALIZATION OF FOREIGN RAILWAYS.

The comparatively low capitalization of American railways is clearly demonstrated by comparison with that of the capital cost, or cost of construction, of the railways of the principal foreign countries set forth in the following statement:

SUMMARY OF RAILWAY CAPITALIZATION OF THE PRINCIPAL FOREIGN RAILWAYS, COMPILED FROM THE LATEST OFFICIAL DATA.

Year	Country	Miles of Line	Capital, or Cost of Construction	Per Mile
	Europe:			
1909	United Kingdom	23,280	$6,401,160,346	$274,964
1909	Germany	36,235	4,048,810,560	111,737
1907	Russia	35,347	* 3,290,952,485	79,136
1908	France	† 24,915	3,535,954,000	141,920
1908	Austria	13,591	1,564,787,400	115,130
1908	Hungary	12,177	790,430,400	64,910
1908–09	Italy (state roads only)	8,719	1,091,665,900	125,205
1908	Spain (13 roads)	6,840	583,632,000	85,327
1906	Sweden	‡ 8,114	257,637,240	31,751
1908–09	Norway (state only)	1,501	63,414,090	42,240
1908–09	Denmark (state only)	1,192	63,625,230	53,125
1908	Belgium (state only)	2,663	480,687,923	180,860
1908	Switzerland	2,791	319,460,741	114,461
	Total Europe	177,365	22,492,218,315	126,859
	Other countries:			
....	Canada	24,731	$ 1,601,050,750	$ 64,740
1908	British India	30,576	1,364,669,375	44,632
1907	Argentine Republic	13,690	820,433,796	59,930
1908	Japan	4,444	190,173,728	42,800
1910	New South Wales	3,643	238,264,750	65,403
1909	United States of America	235,402	13,711,867,733	59,259

*Russian capitalization includes Asiatic railways and covers 41,586 miles, from which the capitalization per mile is computed.

†Exclusive of roads of local interest.

‡23% of the Swedish railways are narrow gauge local roads. In 1908 the state roads had cost $48,500 per mile.

The *Archiv fur Eisenbahnwesen* for June, 1910, places the total capital cost of the railways of the world in 1908 at $51,614,623,440, of which $24,534,511,078 is apportioned to Europe and $27,080,112,362 to the rest of the world. In this computation the average capitalization for Europe is placed at $122,700 and for the rest of the world at $65,800.

According to the report to the British Board of Trade, the paid up capital of the railways of the United Kingdom is divided into five classes as follows:

Shares and stock:	
Ordinary	£ 493,120,763
Preferential	344,590,693
Guaranteed	125,062,022
Loans	11,991,769
Debenture stock	339,641,395
Total ($6,401,160,346)	£1,314,406,642

V

COST OF CONSTRUCTION

In 1909 the Commission received two balance sheet statements from the railways—one on the form prescribed for the previous annual reports and the other according to a revised schedule. The forms for the balance sheet for the year 1910 were adopted after a comparison of these two forms.

In the balance sheet published in the report for 1909 which, it is announced, follows the old form "for the last time," the cost of road and equipment is given as follows:

	(221,679 Miles of Line Represented) Amount 1909	Increase over 1908
Cost of road	* $12,222,830,405	$252,638,869
Cost of equipment	1,228,620,996	63,026,451
General expenditures	157,732,114	8,270,883
Total	$13,609,183,515	$323,936,203

*Includes some data for "Cost of equipment" and "General expenditures" not reported separately

Although the returns to this Bureau follow the revised forms for 1910, from them it is possible to construct a statement along the lines of the form in vogue down to 1909, as in the following statement:

Cost of Road and Equipment, Covering 227,525 Miles of Operated Line for 1910.

	Amount 1910	Increase over 1909
Cost of road (188,169 miles owned)	$7,153,225,035	$549,720,772
Cost of equipment	1,612,092,778	489,682,965
Undistributed cost of road and equipment	(a) 3,200,253,910	120,188,950
Cost of 39,356 miles leased road rental capitalized	2,587,313,920	171,614,044
Total	$14,552,885,643	$1,331,206,731

(a) Includes "General expenditures."

If to the above total for 1910, there be added $363,810,000 to cover the 12,127 miles of line not reporting to this Bureau, the amount of $14,916,695,643 is arrived at, as the approximate cost of construction of the 239,652 miles of operated line in the United States. That it is nothing but an approximation, and not even a close one at that, may be inferred from the demonstration on a preceding page that the cost of existing equipment in 1910 alone must have been over $3,215,000,000.

Compared with the official figures for 1909, plus $77,863,309 securities of switching and terminal companies reported as outstanding in 1908, to represent their cost, the cost of construction in 1910, found as above, exceeds that given for 1909 in the table preceding by $1,229,648,819.

If the revised form of balance sheet has accomplished little else, it has succeeded in securing from the railways very much fuller reports of their construction expenses. And as years go on the balance sheet under the revised system, which calls for the amounts expended since June 30, 1907, that is from records easily accessible, must come to reflect more fully and accurately the cost of construction and especially for equipment. Of course, there are daily and minute expenditures for betterments that can never get into the balance sheet.

If it were possible to burrow through the records of railway construction from the driving of the first spike by Charles Carroll of Carrollton in 1828, down to the last grab-iron attached to the equipment of an insolvent road in 1910, and unearth every dollar irrevocably buried in every depatrment of railway construction and maintenance, the aggregate would dumbfound, if it could not shame, the detractors of American railways.

That it would more than equal the highest estimate put upon their physical value is the belief of every student who has investigated the records of the roads.

Some idea of what it costs to reconstruct old and solidified track in the process of evolution in constant progress on American railways may be had from the records of actual work recently completed, as published in the *Roadmaster and Foreman.* The work consisted in putting up dirt track on crushed stone, replacing 58-lb. rail with 85-lb. rail and renewing 15 ties per 100 ft. The itemized cost was as follows, using negro labor at $1.25 per day and foreman at $60 per month:

COST OF RECONSTRUCTING TRACK.

	Per 100 Ft.	Per Mile
Materials:		
2,784 cu. yds. stone at 45 cts.	$ 23.71	$1,252.80
Ties at 35 cts. f. o. b.	5.25	277.20
133,577 tons rails at $30	75.32	3,977.13
Angle bars at 64 cts.	3.87	204.80
Bolts at $4.90	1.21	63.70
Spikes at $3.20	2.06	108.80
Total materials	$111.42	$5,884.43
Labor:		
Unloading stone	$ 3.11	$ 164.25
Raising grade 7 inches	5.53	292.00
Unloading ties at 0.9 cts.	0.14	7.13
Applying ties at 10.4 cts.	1.56	82.37
Unloading rails	0.18	9.60
Unloading fastenings	0.01	0.53
Laying rails	3.46	184.00
Stone surfacing, 3 inches, 2 inches raise	7.50	396.00
Unbolting old rails	0.18	9.75
Loading old rails	0.44	23.25
Stripping track	1.25	66.00
Total labor	$ 23.36	$1,234.88
Grand total	134.78	7,119.31
Credit 9.15 tons old rails at $16	27.33	1,464.32
Net cost	$107.45	$5,654.99

This naturally leads up to the question of their physical valuation. Is it feasible, could it be made conclusive, and would the game be worth the price of the candle? As the result would make for the enlightenment of the politicians and the public, the writer believes it would.

PHYSICAL VALUATION OF AMERICAN RAILWAYS.

"What is aught, but as 'tis valued?"
—*Troilus & Cressida.*

To be of any value, however, all advocates of a physical valuation of railways will admit that it must be convincing. If it lack the quality of authority that will command acceptance by all parties interested in the problem of just regulation of railways, it were better that such valuation should not be attempted. The abortive attempt would only breed further trouble.

Four states whose Commissions have never been suspected of railway proclivities have made physical valuations of the railways subject to their jurisdiction; and because their appraisals have exceeded the railway capitalization apportioned to the respective states, the advocates of physical valuation have been misrepresenting or rejecting the results.

The four states referred to are Minnesota, South Dakota, Washington and Wisconsin. The valuation in Massachusetts will be considered later. Two others, Michigan and Texas, are sometimes mentioned as having made valuations, but as in neither instance was there a genuine investigation of railway values, they are not seriously considered even by the advocates of valuation themselves. Besides, the Texas valuation was made as far back as 1895 and has not been revised since; while the Michigan valuation was under the direction of the Board of State Tax Commissioners in 1900 and in subsequent revisions perpetuates the errors of the original assessments.

Professor F. H. Dixon of Dartmouth College, now of the Bureau of Railway Economics at Washington, has made a careful analysis of the official valuations in these states, and, after rejecting that made for Texas as worthless, presents the following recapitulation:

SUMMARY OF PHYSICAL VALUATION AND CAPITALIZATION FOR THE STATES OF WASHINGTON, SOUTH DAKOTA, MICHIGAN, MINNESOTA AND WISCONSIN.

State	Physical Value		Capitalization
	Cost of Reproduction	Present Value	
Washington (1905) (a)	$194,057,240	$175,797,025	$168,696,670
South Dakota (1908)	106,494,503	91,695,132	138,850,297
Michigan (1900)	202,716,262	166,398,156	291,605,232
Michigan (1907)	....	204,033,500	357,555,907
Minnesota (1907):			
Estimate A (b)	411,735,195	360,480,160	300,027,696
Estimate B-1	373,820,141	322,565,107	....
Estimate C-2	360,961,548	309,706,514	....
Wisconsin (1909)	296,803,322	240,718,711	311,819,128

(a) In Washington a market value of $195,662,635 is also given.

(b) Estimate A includes multiples on lands for right of way, yards and terminals, and allowances for adaptation and solidification of roadbed; estimate B-1 omits from estimate A multiples on lands for right of way, yards and terminals; and estimate B-2 omits both multiples on land and allowances for adaptation and solidification.

Rejecting the figures for Michigan, where no pretence of a thorough investigation of railway values has ever been made, and the apportionment of capitalization to the state is obviously exaggerated, Professor Dixon's table demonstrates what all close students of the subject have always held, that the present value of American railways exceeds their net capitalization, on which they are entitled to earn a reasonable return.

Moreover, and for reasons noted by Professor Dixon, in the allotment of railway capital to states there is duplication due to intercorporate relations, and some states are credited with more than their share of capitalization in its allocation on a mileage pro-rata basis. In South Dakota, for instance, railway investments in other railways and a share in valuable terminals in St. Paul, Chicago and other points are counted in the capitalization credited to the railways of that state. Allocating capitalization on a track mileage basis, as charging it more equitably according to values expressed in double and auxiliary terminal tracks, the capitalization of the railways of South Dakota would make it $109,444,600 instead of $138,850,297.

In Washington, the commission that appraised the railways apportioned their capitalization in that state at $144,773,419, omitting the Oregon Railroad & Navigation Company. Including this road, the capitalization would be approximately $161,582,000.

In Minnesota, the Commissioners making the appraisal estimated the proportion of capitalization chargeable to that state at $334,979,691, which Professor Dixon found reasons in duplication, etc., for reducing to the $300,027,696 of his table.

In Wisconsin, where Professor Dixon finds a capitalization of $311,819,128, the Commissioners, B. F. Meyer (now of the Interstate Commerce Commission), Halford Erickson and John H. Roemer, in 1909, apportioned $249,299,060 to the state, and included no less than $24,237,000 of the Chicago, Milwaukee & St. Paul's investment in the Chicago, Milwaukee & Puget Sound in the capitalization charged to Wisconsin. Deducting this obvious duplication, alone, would leave the Wisconsin capitalization at approximately $225,000,000.

With these palpable corrections, the lowest valuations of Professor Dixon's table compare with the more accurate capital apportionment by states as follows:

	Cost of Reproduction	Present Value	Capitalization
Washington	$194,057,240	$175,797,025	$161,582,000
South Dakota	106,494,503	91,695,132	109,444,600
Minnesota	360,961,548	309,706,514	300,027,676
Wisconsin	296,803,322	240,718,711	225,000,000
Total	$958,316,613	$817,917,382	$796,054,276

Here it will be seen that the lower or "Present Value", which rejects some of the elements essential to a railway as a going progressive public utility, exceeds the capitalization apportioned to these four states—even though this apportionment still includes duplications.

And although the taxes paid by the railways in each one of these states (Washington, 1908, $1,892,041; South Dakota, 1909, $840,888; Minnesota, 1908, $3,115,027; and Wisconsin, 1910, $3,196,661) demonstrate a value of over $900,000,000, he would be an enthusiast for physical valuation who would claim that the above figures are sufficiently convincing to justify a national appraisal of all the railways.

There is no reason why the railways should oppose such a valuation, *except its uselessness*, and there is good reason why they should favor it, for if made with any approach to fairness and authority it would forever dissipate the popular bogey that the railways of the United States are overcapitalized.

The Appraisal in Massachusetts.

Now comes the appraisal of the property of the New York, New Haven & Hartford Railroad to further confound the advocates of physical valuation with the revelations of a granted prayer. The Company sought the validation of its securities by the state of Massachusetts, and an appraisal was ordered to be made by a Commission consisting of the Board of Railroad Commissioners, the Tax Commissioner, and the Bank Commissioner. They placed the valuation in the hands of a number of experts headed by Prof. G. F. Swain of Harvard, who is the consulting engineer of the Railway Board.

After a thorough investigation of the historical, financial and physical conditions of the property, extending over many months, the Commission not only validated $394,147,563 of the company's liabilities, but credits the company with a "readjusted surplus" of $102,133,237. This makes a total valuation of $496,280,081 of the company's property—not including certain intangible assets, franchises, etc.

The physical property of the company alone, excluding trolley lines, held by stocks and bonds, is valued at $279,871,460.

In his section of the report covering more than half of its 300 typewritten pages, Professor Swain holds that physical valuation is not a measure for rates; that so long as these are reasonable in themselves a fair return should be allowed on capital, including the risk of the undertaking; that the value of a railway is as a going concern; that replacement value is not a proper test, as a seasoned roadbed is more valuable than a new one; that a railway should be kept "as good as new," the cost of all repairs and renewals being charged to operating expenses; and that allowance should be made for appreciated values "provided the property is maintained in good condition." He also found that the condition of the New Haven's property was remarkably good.

VALUATION OF CANADIAN RAILWAYS.

In his report to the Minister of Railways and Canals of Canada for the year 1910, the Comptroller of Statistics discusses the question of the physical valuation of the Dominion railways in this wise:

"It is quite impracticable to ascertain what has been the actual cost of Canadian railways. The cost as represented in stocks and bonds is one thing, and the actual cost quite another. Exchanges of ownership and the destruction of early records have, in many instances, utterly lost to reporting roads the facts with respect to primary expenditures. Nevertheless, during the current year an earnest effort will be made to gather together whatever data are available under that head.

To make an appraisement of the physical value of existing lines would be a stupendous task, and it would also be exceedingly costly. It is doubtful if the results would justify the outlay. With an outstanding liability equal to $52,361 per mile, there could not be any suspicion of general over-capitalization of railways in Canada."

He also states that the capital cost of the Government owned Intercolonial road, 1,450 miles, to date was $92,273,074 or $63,636 per mile.

The outstanding liability of $52,361 per mile is exclusive of $190,753,063 "cash aid" received by the railways.

VI

OWNERSHIP OF AMERICAN RAILWAYS

With the reports of this Bureau covering 6,123 more miles of road owned, there were 319,499 stockholders of record in the 364 companies at the date of the last election of directors prior to June 30, 1910, compared with 320,696 stockholders in 368 companies at a like date for the preceding year. While the decrease of 1,197 in the number of stockholders was due to the absorption of several roads in larger systems and the reorganization of other roads, the fact of any decrease at all may mean a halt in the extension of ownership in American railways among American investors. It does not mean, however, that there has been any general contraction in the distribution of shares in the great systems. The Pennsylvania Railroad Company, for instance, reports an increase of 6,421 stockholders in 1910 over 1909; the Atchison, Topeka & Santa Fe, an increase of 4,987; the Northern Pacific an increase of 1,751 and the Great Northern an increase of 493.

As it stands, the return of 319,499 stockholders for companies owning 188,169 miles of the lines they operate indicates that the ownership of all the railways of the United States is distributed among from 430,000 to 450,000 stockholders. The ownership of railway bonds is believed to be even more widely distributed.

In connection with this phase of the railway situation, the *Commercial and Financial Chronicle* last September published the following statement showing the number of depositors, the total deposits and the railway securities owned by the savings banks of the six named states distinguished for savings deposits:

State	Number of Depositors	Deposits	Railway Securities Owned	Per Cent of Deposits
New York	2,831,380	$1,483,449,494	$250,346,600	16.87
New Jersey	294,106	99,939,691	23,292,375	23.30
Massachusetts	2,040,894	743,101,482	155,429,540	20.91
New Hampshire	192,540	85,103,962	32,398,912	38.06
Connecticut	553,247	263,332,562	108,102,686	41.05
Maine	228,205	88,557,027	45,078,610	50.90
Total	6,140,372	$2,763,484,218	$614,648,723	22.24

Applying the same percentage of railway securities owned to deposits to the deposits of all the savings banks in the United States in 1909 ($3,713,405,710), would indicate that at the present time no less than $835,791,000 of railway securities are held by them.

In a statement submitted to the Senate Committee on Interstate Commerce February 10,1905, the number of depositors in the savings banks of these six states was given as 5,174,718, the total deposits as $2,177,859,256 and the book value of railway securities owned as $442,354,086, or 20.31% of the deposits. This would indicate that where the number of depositors had increased 18% in five and a half years and the total deposits 27%, the railway securities owned by the savings banks of these six states had increased over 38%.

In 1905 it was also found that the three classes of insurance companies—life, fire and accident—owned outright $797,722,038 of railway bonds and stocks and held as collateral $48,167,000 more, making a total of $845,889,038. Far from an exhaustive list of educational institutions had also invested in railway securities to the extent of $47,468,327, bringing this total up to $893,357,365.

If there has been the same relative expansion in ownership of railway securities by these insurance companies and educational bodies as by the savings banks since 1905, all together their holdings today would amount to over $1,847,000,000.

Last November the Comptroller of the Currency revealed another phase of this ownership of railways when he reported that on June 30, 1910, the trust companies held $312,500,000 of their securities, the national banks $298,700,000 and state banks $69,300,000.

Through these different channels direct interest in, if not ownership of, American railways can be traced to the homes of millions of American citizens.

VII

PUBLIC SERVICE OF RAILWAYS

33,270,938,000 passengers carried 1 mile at 1.857 cents per mile.
250,418,076,000 tons of freight carried 1 mile at 7.55 mills per mile.

Among the titles familiar to students of American railway statistics since the passage of the Act to Regulate Commerce in 1887, banished along with the returns of switching and terminal companies under the new accounting rules, the one at the head of this chapter is the one that could least be spared.

Prompt, adequate and safe public service at reasonable rates is the aim and justification of all railway regulation. Upon such public service, providing as cheap and rapid transportation as conditions will permit, depends the prosperity, growth and happiness of the republic.

No "selected statements and assignments", like the substitutes offered over bargain counters, are "just as good" as the summaries that for nineteen years presented in compact form the essential features of the passenger and freight service of the railways of the United States. In order to continue this record of public service in its familiar form as near as may be, the following statement has been compiled:

COMPARATIVE SUMMARY OF PASSENGER AND FREIGHT SERVICE FOR THE YEARS ENDING JUNE 30, 1910 TO 1907.

Item (m=000 omitted)	1910 Bureau Figures	1909* Official Figures	1908* Official Figures	1907 Official Figures
Miles represented...............	227,525	235,402	230,494	227,454
Passenger Service:				
Passengers carried (m)........	933,268	891,472	890,009	873,905
Passengers carried 1 mile (m).	33,270,938	29,109,322	29,082,836	27,718,554
Passengers carried 1 mile per mile of line.................	146,230	127,299	130,073	123,259
Mileage of revenue passenger trains (m)..................	534,847	506,011	505,945	509,328
Average number of passengers in train....................	59	54	54	51
Average journey per passenger.	35.65	32.85	32.86	31.72
Passenger car miles (m)......	2,952,700	2,746,510	2,705,659	....
Average passenger per car mile	11.27	10.60	10.75	....

*Excludes returns from switching and terminal companies, included in 1910 and 1907.

COMPARATIVE SUMMARY OF PASSENGER AND FREIGHT SERVICE FOR THE YEARS ENDING JUNE 30, 1910 TO 1907—Continued.

Item (m=000 omitted)	1910 Bureau Figures	1909* Official Figures	1908* Official Figures	1907 Official Figures
Freight Service:				
Tons carried:				
(a) Number of tons reported (m)...........	1,716,099	1,556,559	1,532,981	1,796,336
(b) Number of tons reported, excluding tonnage received from connecting roads and other carriers (m)....	....	881,334	869,797	977,489
Tons carried 1 mile (m).......	250,418,076	218,802,986	218,381,554	236,601,390
Tons carried 1 mile per mile of line......................	1,100,618	953,986	974,654	1,052,119
Mileage of revenue freight trains (m).................	626,136	568,854	587,218	629,995
Average number of tons in train......................	380	362	351	357
Average haul per ton:				
(a) Typical haul of average railway, miles........	146	141	143	131
(b) Typical haul of all the railways regarded as a system..............	....	....	....	....
Mileage of revenue mixed trains (m).................	32,565	36,236	34,866	32,111
Total revenue train mileage (m)..................	1,293,550	1,112,452	1,129,149	1,171,922
Total mileage of freight cars (m)..................	18,771,921	17,169,413	16,857,003	17,122,259
Average freight car miles per day......................	24.6	22.7	22.1	23.5

*Excludes returns from switching and terminal companies, included in 1910 and 1907.

This statement is especially instructive as it brackets the operations of the railways in the lean years of 1909 and 1908 between the full years 1907 and 1910.

It will be observed that despite the depression in other respects the public service of the railways so far as passengers were concerned went right along increasing, whereas the freight traffic fell off tremendously, and only in the matter of distance had it recovered in 1910.

THE PASSENGER TRAFFIC.

But to appreciate the public service of the railways to the people and industry of the republic at its true value it is necessary to bring that service and the railway revenue therefrom into immediate juxtaposition as is done for the passenger service in the next statement for the last decade.

SUMMARY OF PASSENGER MILEAGE, REVENUE AND RECEIPTS PER PASSENGER MILE, 1900 TO 1910.

Year	Passengers Carried One Mile	Increase over Preceding Year (Per Cent)	Passenger Revenue	Increase over Preceding Year (Per Cent)	Receipts per Passenger Mile (Cents)
1900	16,038,076,200		$323,715,639		2.003
1901	17,353,588,444	8.2	351,356,265	8.5	2.015
1902	19,689,937,620	13.4	392,963,248	11.8	1.986
1903	20,915,763,881	6.2	421,704,592	7.3	2.006
1904	21,923,213,536	4.8	444,326,991	5.3	2.006
1905	23,800,149,436	8.6	472,694,732	6.4	1.962
1906	25,167,240,831	5.7	510,032,583	7.9	2.003
1907	27,718,554,030	10.1	564,606,343	10.7	2.014
1908*	29,082,836,944	4.9	566,245,657	0.3	1.937
1909	29,109,322,589	0.0	563,609,342	D 0.5	1.928
1910 Bureau figures	33,270,938,000	14.3	618,629,770	9.7	1.859
Ten years' increase percent		107.4		91.1	D 7.2

Does not include switching and terminal companies.
D—Decrease.

The phenomenon of an increase of 107.4% in service rendered and of only 91.1% in revenue therefor is only partially explained by the decrease in the average receipts per passenger mile. Behind this lies the fact shown in the next table that the steam railways have been losing the short-haul low-fare travel to the suburban electric cars. Since 1900 this has had the effect to lengthen the average passenger journey from 28 up to 35 miles.

PASSENGER TRAFFIC, 1910–1888.

The entire passenger traffic, service and revenue since the Commission began collecting the data in 1888 is passed under review in the next statement:

Year	Passengers Carried (Millions)	Passengers Carried One Mile (Millions)	Mileage Passenger Trains (Millions)	Average Passengers in Train	Average Journey Miles	Passenger Revenue (Millions)	Average Receipts per Passenger Mile (Cents)
1910........	933	33,270	534	59	35	$618	1.859
1909*.......	891	29,109	506	54	33	563	1.928
1908*.......	890	29,082	505	59	33	566	1.937
1907........	873	27,718	509	51	32	564	2.014
1906........	797	25,167	479	49	31	510	2.003
1905........	738	23,800	459	48	32	472	1.962
1904........	715	21,923	440	46	31	444	2.006
1903........	694	20,915	425	46	30	421	2.006
1902........	649	19,689	405	45	30	392	1.986
1901........	607	17,353	385	42	29	351	2.013
1900........	576	16,038	363	41	28	323	2.003
1899........	523	14,591	347	41	28	291	1.978
1898........	501	13,379	334	39	27	267	1.973
1897........	489	12,256	335	37	25	251	2.022
1896........	511	13,049	332	39	26	266	2.019
1895........	507	12,188	317	38	24	252	2.040
1894........	540	14,289	326	44	26	285	1.986
1893........	593	14,229	335	42	24	301	2.108
1892........	560	13,362	317	42	24	286	2.126
1891........	531	12,844	308	42	24	281	2.142
1890........	492	11,847	285	41	24	260	2.167
1889........	472	11,553	277	42	25	254	2.199
1888........	412	10,101	252	40	24	237	2.349
Increase 1888 to 1910	126%	229%	112%	45%	46%	161%	....
Decrease...	....	....	....	....	....	....	26.9%

*Exclusive of switching and terminal companies in 1908 and 1909.

The solitary net decrease shown in this review of the passenger traffic of American railways covering a period of twenty-two years in the face of an increased cost of everything entering into the handling of that traffic—better tracks, greater speed, more costly cars, increased conveniences and improved terminals, higher rates of interest—is the highest tribute to the efficient management of American railways.

In order to show the diverse conditions under which through mere territorial differences railway service is performed in the United States, the next table presents a review of the passenger traffic for the year 1909 by territorial groups:

SUMMARY OF PASSENGER SERVICE ASSIGNMENTS BY GROUPS FOR THE YEAR ENDING JUNE 30, 1909.

Territory	Passengers Carried (Millions)	Passengers Carried One Mile (Millions)	Mileage Passenger Trains (Millions)	Average Passengers in Train	Average Journey (Miles)	Passenger Revenue (Millions)	Average Receipts per Passenger Mile
Group I....	139	2,759	36	73	20	$ 47	1.709
Group II...	303	6,815	111	60	23	116	1.701
Group III..	94	3,674	73	49	39	68	1.843
Group IV...	28	1,001	21	42	35	22	2.138
Group V....	47	1,905	44	39	40	44	2.284
Group VI...	134	5,296	96	51	39	99	1.872
Group VII..	13	1,275	18	63	91	26	2.070
Group VIII.	50	2,751	49	50	54	55	2.001
Group IX..	20	1,143	21	49	55	27	2.312
Group X...	58	2,486	35	64	43	59	2.354
United States....	891	29,109	506	54	33	$563	1.928

Wherever in the above table the number of passengers per train falls below 50 and the average receipts in the same group are below 2 cents per mile, the passenger traffic is unremunerative and is maintained at the expense of the freight service.

How the short haul passenger business has been cut into by the trolley lines may be judged from the fact that in 1890 the average rail journey in the New England group was only 15.66 miles and in Group II only 16.73 against 20 and 23 miles now.

Prior to 1893, before abandoning the attempt to obtain an exact or satisfactory measure of the cost of passenger service, Professor Adams made the following successive estimates of that cost per passenger mile:

	1888	1889	1890	1891	1892	1893
Average cost of carrying a passenger one mile, cents........	2.042	1.993	1.917	1.910	1.939	1.955

It will be observed that the receipts per passenger mile in 1910 (1.859 cents) is less than any figure in this computation. Is there any doubt that the cost per passenger, taking into consideration all the modern conveniences, the improved service, the higher wages and the vast sums spent on terminals, is at least as high as it was in 1888?

RECEIPTS FROM MAIL AND EXPRESS.

Peculiar interest attaches at the present time to statistics of the mail and express service, which on the railways are incidentals to the passenger service. And here the cold statistics reveal a condition that refutes at a glance the charge that the railways are charging Uncle Sam a living, let alone an extortionate, rate for the transportation of the mails.

The railway receipts from mail and express shown in the statement below afford a remarkable contrast in the growth of these special services:

SUMMARY OF RECEIPTS FROM MAIL AND EXPRESS TO 1909.

Year	Mail		Express	
	Revenues	Percentage of Earnings	Revenues	Percentage of Earnings
1899	$35,999,011	2.74	$26,756,054	2.04
1900	37,752,474	2.54	28,416,150	1.91
1901	38,453,602	2.42	31,121,613	1.96
1902	39,963,248	2.31	34,253,459	2.07
1903	41,709,396	2.19	38,331,964	1.98
1904	44,499,732	2.25	41,875,636	2.12
1905	45,426,125	2.18	45,149,155	2.17
1906	47,371,453	2.04	51,010,930	2.19
1907	50,378.964	1.94	57,332,931	2.21
1908	48,517,563	2.03	58,602,091	2.45
1909*	49,380,783	2.04	59,647,022	2.47
1910 Bureau figures	48,337,255	1.78	67,868,693	2.51
Increase percent	34.3	....	153.3	....

*Excludes switching and terminal companies.

Mark the difference in the increase of express revenue when compared with the mail revenue of the railways; also the reversal in the proportions the revenues from the respective services bear to gross earnings. In 1910 the railway revenue from mail not only shows an absolute decrease below that of any of the preceding years but relatively to gross railway earnings it was the lowest on record.

These figures are especially instructive in connection with the discussion of post office revenues and expenses at present engaging much public attention. The relation of railway mail service in the transportation of mails and mail clerks is vividly shown in the following statement:

	Annual Transportation of Mail by Railroads (Miles)	Number of Railway Mail Clerks	Postal Revenues
1899	287,591,269	8,388	$ 95,021,384
1900	297,256,303	8,695	102,354,579
1901	302,613,325	9,105	111,631,193
1902	312,521,478	9,627	121,848,047
1903	333,491,684	10,418	134,224,443
1904	353,038,397	11,621	143,482,624
1905	362,645,731	12,474	152,826,585
1906	371,661,071	13,598	167,932,783
1907	387,557,165	14,357	183,585,006
1908	407,799,039	15,295	191,478,663
1909	413,546,194	15,866	203,562,383
1910	426,923,109	16,578	224,128,657
Increase in 11 years, percent	48.5	97.9	135.9

Compare the increased service in transportation of mails and mail clerks in this statement with the revenue received therefrom shown in the next preceding table. The service rendered has increased 48.5% while the revenue therefor has only increased 34.3%. And yet after an exhaustive investigation lasting from August, 1898, to July, 1900, the Joint Commission of Congress on January 1, 1901, reported:

> Upon a careful consideration of all the evidence and the statements and arguments submitted, and in view of all the services rendered by the railroads, we are of the opinion that the prices now paid to the railroad companies for the transportation of the mails are not excessive, and recommend that no reduction thereof be made at this time.

If the prices paid to the railways for transporting mail in 1900 were not excessive, what can be said of them now, when half as much more service is rendered for less than one-third more pay?

THE FREIGHT TRAFFIC.

But it is in the transportation of freight, exceeding in weight and distance carried the freight traffic of all the railways of the rest of the world, at rates lower than prevail elsewhere on the face of the globe, that the American railways perform their most conspicuous service to the republic, and, incidentally, to humanity.

"Whether viewed from the standpoint of public benefit, or considered with regard to the volume of business done and profits received by the company", said Prof. Emory R. Johnson in his admirable text book on *American Railway Transportation*, "the transportation of freight is the most important service performed by the railroad. The income from the passenger business is about one-fifth of the total earnings and income of the Railroads of the United States, while the receipts from the freight amount to seven-tenths.

Moreover, social welfare is more dependent upon cheap and unfettered movement of commodities than upon inexpensive and speedy means of travel. * * * It is of incalculably greater consequence that producers should be able to dispose of commodities upon the sale of which their livelihood depends and that consumers should have the power of drawing upon distant as well as near sources of supply" than that "relatively few people should be able to reach their destination promptly and comfortably."

This was written some eight years ago. The relative proportions and importance of the two services remain and promise to remain the same. In 1910 the freight traffic furnished 69.84% of the transportation revenues of the railways, being an inappreciable fraction below the "seven-tenths" of Professor Johnson's estimate. Moreover 70% has been the average of this proportion for the past twelve years.

Except in some of the more densely peopled territories it is the freight that pays the loss on the passenger service.

In order to understand what the railways have had to contend with in maintaining adequate means to provide cheap movement of freight progressively during the past ten years, the next statement presents the ton mileage, freight revenues and average receipts per ton mile since 1900:

SUMMARY OF FREIGHT MILEAGE, REVENUE AND RECEIPTS PER TON MILE, 1900 TO 1910

Year	Number of Tons Carried One Mile	Increase over Preceding Year (Per Cent)	Freight Revenue	Increase over Preceding Year (Per Cent)	Receipts per Ton-Mile (Mills)
1900	141,596,551,161	....	$1,049,256,323	....	7.29
1901	147,077,136,040	3.9	1,118,543,014	6.5	7.50
1902	157,289,370,056	6.9	1,207,228,845	7.9	7.57
1903	173,221,278,993	10.2	1,338,020,026	10.8	7.63
1904	174,522,089,577	.7	1,379,002,693	3.0	7.80
1905	186,463,109,510	6.9	1,450,772,838	5.2	7.66
1906	215,877,551,241	15.7	1,640,386,655	13.1	7.48
1907	236,601,390,103	9.6	1,823,651,998	11.2	7.59
1908*	218,381,554,802	D 7.7	1,655,419,108	D 9.2	7.54
1909*	218,802,986,929	.2	1,677,614,678	1.3	7.63
1910	250,418,076,000	14.4	1,891,380,109	12.8	7.55
Ten years' increase	76.9	....	80.2	....	....

D—Decrease.

The fact of most immediate concern in this table is that notwithstanding the phenomenal freight traffic of 1910 the gross revenue therefrom was only 3.7% greater than the revenue of three years ago. It is unfortunate that there is no means of knowing the exact cost of moving this freight, but the pay rolls of 1910 were over 6% larger than those of 1907.

The last column shows that since the advance in freight rates in 1900 that provoked the agitation resulting in the Hepburn law, railway freight rates have shown remarkable steadiness—the changes in average receipts being due chiefly to the variation in the quantities of different commodities carried.

Where the percentage of increase in revenue from freight for ten years seen in the above table exceeds the increase in tonnage carried one mile, the reverse is true if the comparison be limited to nine years, or from 1901 when freight rates were restored to a remunerative basis, below which they had been forced by ruinous competition in 1898 and 1899, as is shown below:

Freight Traffic 1910 to 1888.

The next summary passes in review all the salient facts concerning the freight traffic since 1888, when the Interstate Commerce Commission began compiling statistics:

Summary of Tons Carried, Ton Mileage, Mileage of Freight Trains, Average Tons in Train, Freight Revenues and Average Receipts per Ton Mile.

Year	Tons Carried (Millions)	Tons Carried One Mile (Millions)	Mileage Freight Trains (Millions)	Average Tons in Train	Average Haul per Ton (Miles)	Freight Revenue (Millions)	Receipts per Ton-Mile (Cents)
1910 (a).....	1,716	250,418	626	380	146	1,891	.755
1909 (b)....	1,556	218,802	568	363	142	1,677	.763
1908 (b)....	1,532	218,381	587	352	144	1,655	.754
1907........	1,796	236,601	629	357	132	1,823	.759
1906........	1,631	215,877	594	344	132	1,640	.748
1905........	1,427	186,463	546	322	130	1,450	.766
1904........	1,309	174,522	535	307	133	1,379	.780
1903........	1,304	173,221	526	310	132	1,338	.763
1902........	1,200	157,289	499	296	131	1,207	.757
1901........	1,089	147,077	491	281	135	1,118	.750
1900........	1,081	141,596	492	270	130	1,049	.729
1899........	943	123,667	(c) 507	243	131	913	.724
1898........	863	114,077	503	226	132	876	.753
1897........	728	95,139	464	204	130	772	.798
1896........	765	95,328	479	198	124	786	.806
1895........	696	85,227	449	189	122	729	.839
1894........	638	80,335	446	179	125	699	.860
1893........	745	93,588	508	183	125	829	.878
1892........	706	88,241	485	181	124	799	.898
1891........	675	81,073	446	181	120	736	.895
1890........	636	76,207	435	175	119	714	.941
1889........	539	68,727	383	179	127	644	.922
1888........	480	61,329	348	176	128	613	1.001
Increase 1888 to 1910	257%	324%	80%	116%	14%	208%	24.5%

(a) Bureau figures, 227,525 miles represented.

(b) Excludes figures of switching and terminal companies.

(c) Includes 75% of mixed train mileage, that being the practice prior to 1900.

The economy of American railway methods of handling freight is demonstrated in the above table in most convincing percentages. With an increase of only 80% in train mileage, 324% more tons were carried one mile. The unparalleled and unappreciated benefit this has enabled them to be to all forms of American industry and progress stands forth in bold relief in the decrease of over 24% in the average receipts per ton mile.

In the twenty-two years since the figures have been officially compiled, these average receipts have decreased 2.46 mills per ton carried one mile. Applied to the tonnage of 1910 this amounted to the enormous sum of **$615,928,000** which in one year the shippers and consignees pocketed. Not one cent of this vast sum remitted to shippers in freight charges ever reached the consumers, for whose benefit all regulation of railways is presumably undertaken.

A study of the prices of commodities during the period in this connection is instructive. And be it remembered that the average freight receipt of 1.001 was the product of a rate so reasonable and just that in the year 1888, it was the lowest average in the world, as it is still lower than the average freight receipts of any country in Europe.

In 1894 the Interstate Commerce Commission published a table giving the following average receipts for the countries named:

	Rates per Ton Mile (Cents)		Rates per Ton Mile (Cents)
United Kingdom	2.80	Sweden	3.20
France	2.20	Norway	2.40
Germany	1.64	Denmark	2.88
Russia	2.40	Holland	1.56
Austria	2.30	Belgium	1.60
Italy	2.50	Switzerland	3.30

These figures were taken from Mulhall's *Dictionary of Statistics*, in which they are credited to the *Journal des Economics*, and refer to the year 1883. According to *Poor's Manual* the average receipts in the United States that year were 1.21 cents per ton mile, which was lower than any European rate then, but not so much lower as the present American rate is below the lowest European rate now.

A comparison of the present German average of 1.42 cents per ton with the rate of 1.64 cents in the above table shows how rigid are the tariffs arbitrarily fixed by a bureaucratic government.

* * * * * * * *

The next summary affords the information necessary for a study of American freight traffic assignments distributed by territorial groups for 1909:

SUMMARY OF FREIGHT SERVICE ASSIGNMENTS BY TERRITORIAL GROUPS FOR THE YEAR ENDING JUNE 30, 1909.

	Tons Carried (Millions)	Tons Carried One Mile (Millions)	Mileage Freight Trains (Millions)	Average Tons in Train	Average Haul per Ton (Miles)	Freight Revenue (Millions)	Receipts per Ton Mile (Cents)
Group I....	65	6,204	24	248	95	70	1.123
Group II...	445	57,863	118	479	130	374	.647
Group III..	354	42,309	96	429	119	250	.589
Group IV...	63	11,936	29	388	189	80	.669
Group V....	111	16,638	60	257	151	137	.824
Group VI...	282	40,231	109	345	149	301	.748
Group VII..	35	8,882	21	385	252	84	.945
Group VIII.	90	16,641	59	257	185	163	.981
Group IX..	50	7,153	27	242	144	77	1.070
Group X...	60	10,944	26	362	181	133	1.223
United States....	1,556	218,802	568	363	142	1,677	.763

With slight variations the proportions shown in this table for the year 1909, may be applied to the totals for 1910.

PROPORTIONS OF COMMODITIES MOVED.

The next summary classifies the tonnage moved by commodities for the years 1910 and 1909:

SUMMARY OF TONNAGE AND PROPORTION OF DIFFERENT CLASSES OF COMMODITIES MOVED, 1910 AND 1909.

Class of Commodity	1910		1909	
	Tonnage Reported as Originating on Line	Per Cent of Aggregate	Tonnage Reported as Originating on Line	Per Cent of Aggregate
Products of agriculture..........	85,794,884	8.84	73,683,720	8.92
Products of animals.............	22,558,992	2.33	20,593,325	2.49
Products of mines..............	537,692,597	55.44	459,560,732	55.60
Products of forests..............	103,718,861	10.69	97,104,700	11.75
Manufactures..................	145,066,685	14.96	108,677,129	13.15
Merchandise....................	38,303,536	3.95	33,975,628	4.11
Miscellaneous..................	36,721,698	3.79	32,897,504	3.98
Total......................	969,856,253	100.00	826,492,765	100.00

Here the most significant figure is the percentage of 14.96 for tonnage of manufactures in 1910, which marks the recovery of this class of freight to its normal proportion of the total movement, as is more clearly evident in the next statement which shows the percentage of commodity tonnage moved since the Commission has compiled the information. In this summary a division is made into low and high rate freight:

Summary Showing Percentage of Freight Traffic Movement by Classes of Commodities, 1899 to 1910.

Year	Low Rate Freight Percentage of Aggregate					High Rate Freight Percentage of Aggregate			
	Products of Agriculture	Animals	Mines	Forest	Total	Manufactures	Merchandise	Miscellaneous	Total
1899	11.33	3.12	51.47	10.89	76.81	13.45	4.49	5.25	23.19
1900	10.35	2.87	52.59	11.61	77.42	13.41	4.26	4.91	22.58
1901	10.76	2.91	51.67	11.67	77.01	13.75	4.16	5.08	22.99
1902	9.23	2.64	52.36	11.64	75.87	14.49	4.37	5.27	24.13
1903	9.56	2.63	51.56	11.67	75.42	14.39	4.69	5.50	24.58
1904	9.59	2.74	51.56	12.53	76.42	13.41	4.83	5.34	23.58
1905	9.03	2.54	53.59	11.24	76.40	13.60	4.32	5.68	23.60
1906	8.56	2.32	53.09	11.24	75.21	14.81	4.06	5.92	24.79
1907	8.62	2.29	53.39	11.38	75.68	15.41	3.89	5.02	24.32
1908	8.74	2.46	55.72	11.35	78.27	13.15	4.04	4.54	21.73
1909	8.92	2.49	55.60	11.75	78.76	13.15	4.11	3.98	21.24
1910	8.84	2.33	55.44	10.69	77.30	14.96	3.95	3.79	22.70

It will be observed that the increase in the movement of high rate freight was due wholly to the larger movement of manufactures. The movement of products of mines was well maintained, while that of products of forests fell off nearly 10%.

From returns covering less than half the mileage of the United States, the Commission, since 1908, has compiled the following tonnage statistics for eight selected commodities, which although incomplete are significant:

Summary of Selected Commodities for the Year Ending June 30, 1909—118,423 Miles Represented

Commodity	Freight Carried in Carload Lots	Ton-Mileage of Freight Carried in Carload Lots	Revenue from Freight Carried in Carload Lots	Average Receipts per Ton per Mile from Same
Grain	28,279,121	6,311,659,929	$38,583,377	0.611
Hay	4,650,064	750,121,405	7,690,364	1.025
Cotton	3,793,428	855,837,978	14,352,854	1.781
Live stock	10,369,251	2,426,400,063	28,298,480	1.166
Dressed meats	2,198,045	679,429,109	6,149,390	.905
Anthracite coal	27,091,241	4,820,761,131	29,082,522	.603
Bituminous coal	144,045,174	16,369,513,734	83,855,992	.512
Lumber	52,085,477	8,588,245,483	66,106,104	.770

It may be of interest to compare the foregoing average receipts for selected commodities with the following statement taken from the report of the Chief Commissioner of Railways for the province of New South Wales for the year 1910.

STATEMENT OF TON MILE RECEIPTS ON VARIOUS COMMODITIES AND AVERAGE HAUL ON THE GOVERNMENT RAILWAYS OF NEW SOUTH WALES FOR THE YEAR ENDING JUNE 30, 1910.

Commodity	Average Haul Miles	Receipts per Ton Mile (Cents)
Coal and shale	29.41	1.06
Firewood	26.68	1.58
Grain and flour	247.08	.72
Hay, straw and chaff	208.52	.76
Wool	299.07	3.90
Live stock	268.79	2.38
General merchandise (including all other goods)	91.63	3.20
Total	84.69	2.00

To these averages for New South Wales nearly 15% has to be added to meet the terminal charges, which are not included in the ton mile charge. Without this, however, it appears that they are from two to three times higher than the average of American freight rates—a fact established by the average of two cents on all goods against three-quarters of a cent in the United States.

BRITISH TARIFFS.

The maximum British rates allowed under the Railway and Tariff Acts covering the above commodities, within which the railway companies are permitted to make charges without preferences or discrimination, taking those of the London & Northwestern schedule as representative, are as follows:

MAXIMUM RATES FOR CONVEYANCE PER TON PER MILE.

Class	Any Part First 20 Miles (Cents)	Any Part Next 30 Miles (Cents)	Any Part Next 50 Miles (Cents)	Any Part Remainder of Haul (Cents)	Terminal at Each End per Ton (Cents)
A Including coal	1.90	1.70	1.00	.80	6
B	2.50	2.00	1.60	1.00	12
C Including grain and lumber	3.60	3.00	2.40	1.40	24
1 Including hay and raw cotton	4.40	3.70	2.80	2.00	36
2 Including raw wool	5.30	4.60	3.60	3.00	36
3	6.20	5.30	4.00	3.60	36
4 Including dressed meat	7.20	6.30	5.00	2.20	36
5	8.60	7.40	6.50	5.00	36

Animals are placed in a separate class. For cattle the charge is cents per head per mile up to 50 miles. After that 2.60 cents per ile per head with a terminal charge of 8 cents at each end and 6 ents per head for loading and unloading.

Is it any wonder that under such tariffs the average receipts per on mile in the United Kingdom should be estimated at 2.34 cents?

VIII

EARNINGS AND EXPENSES

Following the practice of the Commission before the innovation in accounting methods impaired anything like "direct or close comparison" with figures for similar items contained in previous statistical reports, the Bureau next, in natural sequence to the Publi Service of the railways, presents a brief review of their receipts an expenditures in connection therewith.

In doing so the endeavor of the writer is to exclude as far as possible all duplications arising on account of intercorporate payment To this end it is held to be absolutely essential to a true and unobstructed view of the relations of regulation to the industry regulate that the review should be confined strictly to those revenues derive from transportation, and to those expenses incurred in providin that transportation. Anything beyond this merely misleads th student with "watered" statistics.

Therefore the first summary under this head will present th income account of the railways of the United States for the year 191 compared with that for 1909 as if such "Income Account had resulted from the actual operation had all such operations been conducted by a single corporation," to quote once more the words the official report for 1909:

Comparative Income Account of the Railways in the United States, Considered as a System, for the Years Ending June 30, 1910 and 1909.

Item	Amount			
	1910		1909	
iles represented	227,525		235,402	
perating revenue:				
From passengers	$ 618,629,770		$ 563,609,342	
From freight	1,891,380,109		1,677,614,678	
From mail	48,337,255		49,380,783	
From express	67,868,693		59,647,022	
Other revenue from operation	81,583,163		68,425,713	
Total revenues from operation		$2,707,798,990		$2,418,677,538
perating expenses	$1,794,458,725		$ 159,443,410	
Taxes	$ 103,435,985		$ 90,529,014	
Total		1,897,894,710		1,689,972,424
Net revenues from operation		$ 809,904,280		$ 728,705,114
Net revenue from outside operations		5,462,046		3,936,969
Total operating income		$ 815,366,326		$ 732,642,083
isposition:				
Interest on funded debt	$ 344,717,654		$ 331,994,861	
Interest on current liabilities	14,595,995		22,158,417	
Rent paid for lease of road	123,976,236		114,733,212	
Additions and betterments charged to income	53,577,527		24,933,255	
To other reserves	3,315,439		20,632,313	
Other deductions	68,723,266		64,632,596	
Total deductions		$ 608,906,117		$ 579,084,654
come available for dividends and surplus		$ 206,460,209		$ 153,557,429

In 1909 the Commission reported that $74,248,537 was carried to
urplus and that the leased roads declared $34,617,102 dividends
om current income from lease of road. Deducting one and adding
e other left $113,925,994 as the total sum available for dividends
ut of revenues from transportation in 1909.

Assuming that the same sums were charged to surplus ($74,248,537) and paid by leased roads in dividends out of rents received
34,617,102) in 1910, and deducting the balance ($39,631,435) from
e $206,460,209 found available in 1910 for dividends and surplus,

leaves **$166,828,874** as all that was available for dividends out o transportation in the phenomenal railway year of 1910.*

In 1909 the leased roads paid $51,971,552 interest out of rental received by them. Added to the amounts paid in interest b the operating roads this would make $411,285,201 paid in interest o funded debt and other indebtedness in 1910. Deducting the fourtee odd millions paid on current liabilities, this is equal to 4.60% o net funded debt and less than 4.05% on the total funded deb outstanding in 1910.

From the above it is clear that approximately $580,000,000 i the limit of return made to the capital invested in American railway in the year ending June 30, 1910. This is less than 6% on $10,000,000,000; less than 5% on $12,000,000,000; less than 4.25% on thei net capitalization; less than 4% on $15,000,000,000 and less than 3% on $20,000,000,000, which Senator Cummins over a year ago estimated to be their present capitalization as the probable result of physical valuation.

INCOME FROM OTHER SOURCES.

In addition to their income from transportation, the railway reporting to this Bureau received no less than $253,014,167 "incom from other sources." The principal other sources from which thi income came were "Dividends declared on stocks owned or controlled," "Interest on funded debt owned or controlled," "Interes on other securities, loans and accounts."

In 1908 when the Commission reported the phenomenal dividen total of $390,695,351, it also reported $274,450,192 as "income othe than operating income" and that of this no less than $228,318,55 was derived from the three sources named above.

In 1909 the income from these sources dropped to $153,419,82 or nearly $75,000,000. Therefore it was through no mere coincidenc that the gross dividends also dropped from $390,695,351 in 1908 t $321,071,626, or nearly $70,000,000 in a year when the net transpo tation revenues were $93,000,000 greater than the year before.

As a matter of fact these exaggerated dividends are annuall swelled by the amount of this duplicated and triplicated income fro other sources. And as this has assumed large proportions again i 1910, we may expect the Commission to announce dividends clo to the $400,000,000 mark. More than $250,000,000 of these div dends will be water.

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*And yet the rate decision rested on the assumption that the railways in 1910 distribut $405,131,650 in dividends from rates and fares.

In 1910 the roads reporting to the Bureau handling 97% of the traffic of the United States declared dividends to the total amount of $278,676,424. How much of this was from the $253,014,167 income from other sources than transportation, the writer cannot say. But if it were all from "operating revenues" it would demonstrate the fictitious character of a large part of the dividends annually charged against the railways by the Commission.

WHAT BECOMES OF THE ITEM OF RENT.

From the following official summary of the disposal of the rent paid by the operating roads in 1909, the probable disposition of the $129,365,696 (including taxes) paid to the leased roads in 1910 may be approximately allocated:

CONDENSED INCOME ACCOUNT AND PROFIT AND LOSS ACCOUNT OF LEASED ROADS FOR THE YEAR ENDING JUNE 30, 1909.*

INCOME ACCOUNT.

Gross income from lease of road	$116,533,953	
Salaries and maintenance of organization	406,309	
Taxes accrued	5,389,460	
Net income from lease of road		$110,738,184
Other income		3,778,493
Gross corporate income		$114,516,677
Deductions from gross corporate income		61,618,049
Net corporate income		$ 52,898,628
Disposition of net corporate income:		
Dividends declared from current income	$ 34,617,102	
Additions and betterments charged to income	1,257,633	
Appropriations to reserves and miscellaneous items	357,808	
Total		$ 36,232,543
Balance carried forward to credit of profit and loss		16,666,085

PROFIT AND LOSS ACCOUNT.

Credit balance on June 30, 1908	$ 25,406,156
Credit balance for year 1909 from income account	16,666,085
Total	$ 42,072,241
Dividends declared out of surplus	14,230,229
Difference	$ 27,842,012
Other profit and loss items—credit balance	6,715,969
Balance credit June 30, 1909, carried to balance sheet	$ 34,557,981

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*Excludes returns for switching and terminal companies and a few roads the reports of which were t complete.

The principal amount included under the blind item "Deductions from gross corporate income" is $49,906,920 for interest on funded debt.

DISTRIBUTION OF GROSS EARNINGS.

How the gross earnings ($2,707,798,990) of the railways reporting to this Bureau in 1910 were distributed is shown below in comparison with a similar division of earnings for 1909 and 1907:

SUMMARY SHOWING DISTRIBUTION OF GROSS EARNINGS OF 227,525 MILES OF LINE IN 1910 COMPARED WITH THE PERCENTAGES FOR 1909 AND 1907.

Item	(Gross Earnings, 1910, $2,707,798,990.)			
	Amount 1910	Per Cent 1910	Per Cent 1909	Per Cent 1907
Operating expenses:				
Maintenance of way and structures	$360,999,868	13.33	12.62	13.27
Maintenance of equipment	407,700,524	15.06	15.10	14.22
Traffic expenses	55,176,869	2.04	2.08	....
Transportation expenses	905,404,200	33.44	33.67	37.50
General expenses	65,177,264	2.40	2.58	2.54
Total	$1,794,458,725	66.27	66.03	67.53
Disposition of same:				
Pay of employes	$1,137,016,508	42.00	41.00	41.42
Fuel for locomotives	213,838,384	7.89	7.76	7.74
Oil and water for locomotives	20,843,907	.77	.84	.88
Material and supplies	247,863,411	9.15	9.24	11.81
Hire and rent of equipment and facilities	60,429,281	2.23	2.30	2.46
Loss and damage	53,991,820	1.99	2.37	1.83
Miscellaneous	61,127,805	2.24	2.52	1.39
Total expenses	$1,794,458,725	66.27	66.03	67.53
Taxes†	103,435,985	3.82	3.72	3.10
Rentals of leased roads	123,976,236	4.78	4.84	4.69
Interest on funded debt and current liabilities	359,313,649	13.27	13.30	13.14
Dividends	132,211,662	4.88	7.23	8.78
Deficits of weak companies	18,404,235	.69	.85	.19
Betterments, reserves and sundries	56,892,966	2.10	2.00	1.50
Other deductions and surplus	118,453,141	4.37	2.03	1.07
Total (gross earnings)	$2,707,798,990	100.00	100.00	100.00
Gross earnings 1909	2,418,677,538	....	....	....
Gross earnings 1907	2,589,105,578	....	....	....

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*Legal expenses, advertising and insurance are included under "Miscellaneous"; stationery and printing under "Material and Supplies."

†Includes taxes paid by leased lines and deducted from rent.

In these assignments absolute accuracy is impossible because railway accounts are confused by the injection into them of "income from other sources", almost wholly intercorporate rents, interest and dividends. In 1910 for instance, the operating roads reporting to this Bureau received no less than $253,014,167 income from other sources than transportation. This is the sum that most nearly marks the duplication of interest and dividends.

The three items rent, interest and dividends in the above tables constitute the entire capital charge on transportation revenues.

IX

TAXES

The 362 roads reporting to this Bureau, owning 188,169 miles of line and operating 227,525, of which 39,256 were leased, paid $98,046,525 taxes in 1910. Adding to this the sum of $5,389,460, which was paid out of the rents received by the leased roads in 1909, makes the sum of $103,435,985 that figures in the income account—the rental being reduced by the amount of the taxes paid by the leased roads.

Placing an estimate of $200 a mile on the 12,127 miles of line not represented in this report would bring the total taxes up to $105,861,365 for 1910. As this is slightly above the taxes reported to the Commission according to the monthly bulletins, the latter sum, $104,144,076, is used in the next summary which gives the figures of taxation for the railways of the United States for the past twenty-one years:

Summary of Taxes Paid by the Railways of the United States Since 1898 Annually and Relatively, and Percentage of Gross Revenues.

Year	Taxes Paid	Per Mile	Percentage of Earnings
1910 (Official figures)	$104,144,076	$439	3.74
1909	89,026,226	382	3.73
1908	84,555,146	367	3.53
1907	80,312,375	353	3.10
1906	74,785,615	336	3.21
1905	63,474,679	292	3.04
1904	61,696,354	290	3.12
1903	57,849,569	281	3.04
1902	54,465,437	272	3.15
1901	50,944,372	260	3.20
1900	48,332,273	250	3.24
1899	46,337,632	247	3.53
1898	43,828,224	237	3.51
1897	43,137,844	235	3.84
1896	39,970,791	219	3.48
1895	39,832,433	224	3.70
1894	38,125,274	216	3.56
1893	36,514,689	215	2.99
1892	34,053,495	209	2.90
1891	33,280,095	206	3.04
1890	31,207,469	199	2.96
1889	27,590,394	179	2.86

During the period covered by this table the taxes of the railways increased over 269% and over 145% per mile of line.

X

DAMAGES AND INJURIES TO PERSONS

In proportion to revenues the payments by the railways on account of injuries to persons and loss and damage of property were less in 1910 than for the preceding year. The amounts as reported to this Bureau were as follows:

SUMMARY OF PAYMENTS ON ACCOUNT OF INJURIES TO PERSONS AND LOSS AND DAMAGE DURING THE YEAR 1910.

Account	Amount	Amount	Per Cent of Earnings
Injuries to persons		$23,284,145	.86
Maintenance of way	$1,887,261		
Maintenance of equipment	1,375,924		
Transportation	20,020,960		
Loss and damage		30,707,675	1.13
To freight	21,852,391		
To baggage	370,323		
To property	4,808,993		
To live stock, etc	3,675,968		
Total		$53,991,820	1.99

The chief decrease was in the sum paid on account of damage to freight, being $21,852,391 in 1910, as against $24,768,453 in 1909. It appears from the next table that the payments on these accounts during the depressed years 1908 and 1909 were heavier than those for the full years 1907 and 1910. Whether or not this was the aftermath from the rush and congestion of 1907 it is difficult to say.

Payments on Account of "Loss and Damage" and "Injuries to Persons" 1899 to 1910 and Proportion to Gross Earnings.

Year	Loss and Damage		Injuries to Persons	
	Amount	Per Cent of Earnings	Amount	Per Cent of Earnings
1899	$ 5,976,082	.455	$ 7,116,212	.541
1900	7,055,622	.474	8,405,980	.565
1901	8,109,637	.510	9,014,144	.567
1902	11,034,686	.639	11,682,756	.676
1903	13,726,508	.722	14,052,123	.739
1904	17,002,602	.861	15,838,179	.802
1905	19,782,692	.946	16,034,727	.770
1906	21,086,219	.907	17,466,864	.751
1907	25,796,083	.996	21,462,504	.829
1908	34,631,243	1.447	20,088,543	.839
1909	32,922,986	1.386	23,456,038	.988
1910	30,707,675	1.134	23,284,145	.859
Increase in 11 years, per cent	414	149	227	59

In the United Kingdom in 1909 the railways paid $1,249,805 compensation to employes, $594,940 for personal injuries to passengers and $1,864,945 damages to or loss of goods—a total of $3,709,690, or one-half of 1 per cent on the gross earnings of British railways, against nearly 2 per cent here. Moreover there has been a marked decrease in the payment of British roads on this account since 1900, when they were over $4,275,000 on a smaller traffic.

XI

LOCOMOTIVE FUEL

With experts in almost continuous session experimenting on means to increase the tractive power of coal per pound the ratio of the cost of fuel to revenue produced in 1910 reached a figure which has only been exceeded twice in the record. In 1904 and 1908 the proportion of fuel cost to earnings was higher than in 1910, the first reflecting the jump in the price of coal in 1903 and the second the advance in the fall of 1907. The recession in the proportion in 1909 similarly followed the drop which reached the lowest point according to government statistics in June, 1909. Relatively to the average price 1890–1899 = 100, the price in that month registered 126. During the succeeding months it ran up to 133.9.

These conditions are reflected throughout the following summary:

Summary of Cost of Locomotive Fuel and Proportion to Earnings and expenses of American Railways, 1910 to 1899, with Price of Bituminous Coal per Ton During the Same Period.

Year	Miles of Line	Cost of Locomotive Fuel	Proportion to Operating Expenses	Proportion to Gross Earnings	Price of Coal at Mines per Ton*
1910 Bureau figures.........	227,525	$213,838,384	11.920	7.89	....
1909 Official...............	235,402	188,735,868	11.804	7.81	....
1908.......................	230,494	201,905,054	12.097	8.44	1.12
1907.......................	227,454	200,261,975	11.471	7.74	1.14
1906.......................	222,340	170,499,133	11.119	7.34	1.11
1905.......................	216,973	156,429,245	11.278	7.51	1.06
1904.......................	212,243	158,948,886	11.893	8.05	1.10
1903.......................	205,313	146,509,031	11.675	7.70	1.24
1902.......................	200,154	120,074,192	10.776	6.96	1.12
1901.......................	195,561	104,926,568	10.602	6.61	1.05
1900.......................	192,556	90,593,965	9.809	6.09	1.04
1899.......................	187,534	77,187,344	9.478	5.88	.87

*These figures are from the latest report of the United States Geological Survey.

Science and invention have done much to further economy in the use of fuel in locomotives, and have helped to meet the advancing cost of labor in railway working, but it is evident from the above table that the need of the hour is a theoretical attorney who can regulate the cost of coal at the pit's mouth. But coal, like everything else, costs more as the demand for it increases, as was the case in 1910.

The statistics now divide fuel between yard and road locomotives—that for the former in 1910 costing $29,185,993, and for the latter $184,652,391. The Commission also makes a division between large and small roads from which it appears that the former use over 97% of the fuel.

XII

ACCIDENTS

Last year the Bureau was able to present a most complete review of the accident record of the railways of the United States from the annual reports to the Interstate Commerce Commission, including the most remarkable statement of comparative immunity from fatalities to passengers ever published. This year, unfortunately, the contagion of innovation has introduced chaos into this department of railway statistics and left them at the mercy of the quarterly bulletins, which riot in ghastly totals without any reassuring facts as to the general immunity that attends railway travel and operation.

It is horrifying to learn that 3,804 persons were killed and 82,374 injured in railway accidents in the year 1910, and there is a fresh appeal to Congress and the state legislatures to stop the slaughter with new laws and safety devices. The public mind is naturally shocked and left to conclude that railway operation is accountable for all this horror, when the record shows that three-quarters of the deaths and more than that proportion of the injuries were due to the victim's own negligence or carelessness.

Nothing is said of the almost incomprehensible units of risk involved in railway operation, that reduce the proportion of casualities to an amazingly small ratio.

In 1910, the year of phenomenal railway activity, and therefore of increased danger, 933,268,562 passengers were carried 33,240,938,000 miles on the railways reporting to this Bureau and 179 were killed in accidents to trains.

But this does not begin to tell the story, for the trains conveying these passengers had to use the same tracks, crowded with the movement of 1,716,099,742 tons of freight 146 miles per ton.

When one considers the labyrinth of 350,000 miles of tracks and sidings, the millions of trains and cars through which the American passenger traffic has to thread its way at express speed, one has to join with Charles Francis Adams, Jr., in the view that "there is no more creditable monument to human skill and foresight than the statistics of railroad accidents."

It is an unfortunate fact that the spirit in which these statistics are officially handled tends to discredit that "human skill and human foresight" in the mistaken infatuation for safety appliances.

THE SAFETY OF AMERICAN RAILWAYS.

Last year this Bureau was enabled to compile a statement showing how 347 companies out of 368 reporting to it and operating 159,657 miles of line had carried 570,617,563 passengers 18,953,025,000 miles without a single fatality to a passenger in a train accident. This year the complete figures are not available because the Commission has abandoned the call for accident statistics in its annual reports. The Bureau, however, sent out the regular form and received returns from a majority of the roads—although a number of important systems had failed to keep the statistics because not officially required to do so.

From those reporting, the summary below has been compiled, which gives the traffic statistics of the roads that reported complete immunity from a fatality to passengers in train accidents during the year, in comparison with like information for 1909 and 1908, when the data was more complete:

SUMMARY OF MILEAGE AND TRACKAGE OF ROADS ON WHICH NO PASSENGER WAS KILLED IN A TRAIN ACCIDENT DURING THE YEARS 1910, 1909 AND 1908.

	1910	1909	1908
Number of operating companies.......	253	347	316
Mileage of these companies...........	85,003	159,657	124,050
Passengers carried....................	255,789,329	570,617,563	455,365,447
Passengers carried 1 mile............	9,273,441,000	18,953,025,000	14,776,368,000
Tons of freight carried...............	659,299,799	1,116,877,052	916,123,410
Tons of freight carried 1 mile.........	86,118,089,000	151,974,495,000	121,589,399,000
Passengers killed in train accidents....	None	None	None
Passengers injured in train accidents...	1,733	2,585	2,695

The significance of this table may be judged from the fact that it covers a mileage of railway operation equal to the aggregate railway mileage of the United Kingdom, Germany and France, and presents a record of immunity from fatalities to passengers unparalleled except in the United States in previous years.

It is to be regretted that the official reports this year failed to furnish more complete returns of such reassuring information. Next year the Bureau will adopt measures to obtain the data independently.

ALMOST PERFECT IMMUNITY.

What the expressive slang of our time would call "near-immunity" was the experience of no less than thirteen systems, having a mileage almost equal to that of the United Kingdom and including no less than four systems of over 3,000 miles each, and one of exceptionally heavy passenger density. The record shows the following facts in regard to roads on which only one passenger was killed in a train accident in 1910, in connection with the like data for 1909:

SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH ONLY ONE PASSENGER WAS KILLED IN A TRAIN ACCIDENT DURING THE YEARS 1910 AND 1909.

	1910	1909
Number of operating companies	13	10
Mileage of these companies	22,647	27,681
Passengers carried	66,180,574	185,447,507
Passengers carried 1 mile	2,492,598,000	5,778,621,000
Tons of freight carried	175,619,700	213,086,612
Tons of freight carried 1 mile	22,967,352,000	40,177,881,000
Passengers killed in train accidents	13	10
Passengers injured in train accidents	623	778

In order that the reader may appreciate the high standard of immunity from fatalities to passengers in train accidents, his attention is called to the following table from the report of the British Board of Trade (July 18, 1910) showing "the average numbers of passengers as killed or injured in train accidents, and the average number of passenger journeys (exclusive of season tickets) for three periods of ten years and one of four years, ending 1884, 1894, 1904 and 1908, respectively, with figures for the year 1909:

AVERAGE NUMBER OF PASSENGERS KILLED AND INJURED IN TRAIN ACCIDENTS ON BRITISH RAILWAYS 1875 TO 1909.

Year	Number of Passengers Killed and Injured in Train Accidents		Number of Passenger Journeys (exclusive of Journeys by Season-Ticket Holders)* (Millions)
	Killed	Injured	
1875–1884 (Average)	28	915	598.4
1885–1894 "	21	600	798.6
1895–1904 "	12	581	1,100.7
1905–1908 "	29	461	1,244.2
1909	1	390	1,264.8

*The number of annual season tickets issued in 1909 was about 729,000.

The passenger mileage of British railways is less than 14,000,000,000 and their freight ton mileage less than 13,000,000,000. It is from the excess of the latter in the United States that the greatest peril to passenger traffic comes.

The suburban traffic of American railways which has about the same length of journey as the British average is practically immune from fatalities to passengers in train accidents.

Continuous Immunity.

Nothing in the work of this Bureau is more encouraging than the evidence its records for the past seven years afford of the continuous immunity from fatalities to passengers of a large majority of its railways, and therefore the regret is more keen that just as these statistics reach a comprehensive basis their continuity should be broken by an unprofitable innovation in the official reports. In the concurrence of force, speed and persons in almost incalculable numbers, accidents must befall. It is a law of nature. It is only through unintermitting vigilance, care and precautions that these accidents can be reduced to a minimum and these are not humanly possible.

Wherever there is a mile of track with any movement of traffic whatever, there is daily and hourly potentiality of a train accident.

For *Seven* consecutive years the records of this Bureau show that there were at least 5,171 miles of line, with all their accessories, in operation without a fatality to a single passenger in a train accident.

For six years there were 18,875 miles of line that enjoyed a similar enviable immunity.

The following statement shows the extent of this consecutive immunity for the roads reporting to this Bureau in 1910 and 1909:

Statement Showing Number of Railways and Mileage on which No Passenger has been Killed in a Train Accident, 1904 to 1910.

	Number of Companies	Miles of Line	Number of Companies	Miles of Line
	1904 to 1910		1904 to 1909	
Seven years to 1910..............	11	5,171	....	....
Six years to 1910................	64	18,875	To 1909 17	9,641
Five years to 1910...............	100	22,218	" " 95	44,894
Four years to 1910...............	127	28,163	" " 177	57,331
Three years to 1910..............	158	37,534	" " 228	69,713
Two years to 1910................	194	61,189	" " 287	108,710
One year, 1910...................	253	85,003	1909 .. 347	159,657

It should be remembered that no road has been admitted to either of these compilations where the immunity has been interrupted by a single fatality. Moreover the statistics of the Bureau in 1904 covered less than two-fifths of the operated mileage of the United States and not until 1906 did they reach anything like their present completeness.

RAILWAY ACCIDENTS IN 1910.

Having seen the reassuring side of railway operation, the next study turns to the record of accidents which are now reported monthly to the Commission and published in its quarterly Accident Bulletins. As the new regulation, requiring these to include trespassers and other persons killed in connection with the railway industry, did not come into force until July 1, 1910, the figures of the Bulletins prior to June 30, last, are confined to passengers and employes as shown in the following table:

SUMMARY OF CASUALTIES TO PERSONS IN RAILWAY ACCIDENTS FOR THE YEARS ENDING JUNE 30, 1910 AND 1909.

Class of Accident	1910				1909			
	Passengers		Employes		Passengers		Employes	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Collisions	78	4,428	355	3,333	94	3,033	248	2,362
Derailments	89	2,946	253	1,868	37	2,717	227	1,448
Miscellaneous train accidents, including locomotive boiler explosions	52	142	107	1,590	......	115	45	1,067
Total train accidents	217	7,516	715	6,791	131	5,865	520	4,877
Coupling or uncoupling	......	....	206	2,985	......	....	161	2,353
While doing other work about trains or while attending switches	......	....	157	18,240	......	....	93	14,315
Coming in contact with overhead bridges, structures at side of track, etc	3	33	96	1,377	2	36	76	1,229
Falling from cars or engines or while getting on or off	137	2,833	586	13,196	137	3,076	481	10,259
Other causes	64	3,374	1,623	26,029	65	3,139	1,125	18,771
Total (other than train accidents)	204	6,240	2,668	61,827	204	6,251	1,936	46,927
Total (all classes)	421	13,756	3,383	68,618	335	12,116	2,456	51,804
Totals in 1908	406	12,645	3,358	56,344	......	....	....	....
" " 1907	647	13,597	4,353	62,689	......	....	....	....
" " 1906	418	11,185	3,807	55,524	......	....	....	....
" " 1905	537	10,040	3,261	45,426	......	....	....	....
" " 1904	420	8,077	3,367	43,266	......	....	....	....
" " 1903	321	6,973	3,233	39,004	......	....	....	....
" " 1902	303	6,089	2,516	33,711	......	....	....	....

While the fatalities to both passengers and employes show a material increase over the phenomenally low record of 1909, it should be observed that considering the volume of business it is otherwise the least harrowing since the Commission began the publication of its accident bulletins under the law of March 3, 1910, which are covered in the above totals for 1902 to 1910.

ACCIDENTS ON BRITISH RAILWAYS.

Premising that American railways operate nearly eleven times the mileage; carry two and one-half times as many passengers one mile; handle twenty times as many tons of freight one mile, and employ three times as many men as the railways of the United Kingdom, thereby establishing a ratio of at least 10 to 1 as the ratio of risk, it is worth while to compare the foregoing statement of accidents on American railways with the similar summary from the reports of the British Board of Trade that follows:

Class	1909		1908	
	Killed	Injured	Killed	Injured
A. Passengers:				
From accidents to trains, rolling-stock, permanent-way, etc.	1	390	....	283
By accidents from other causes	93	2,980	107	3,388
B. Servants of Companies or Contractors:†				
From accidents to trains, rolling-stock, permanent-way, etc.	16	129	6	164
By accidents from other causes	353	23,834	432	24,181
C. Other Persons:				
From accidents to trains, etc.	....	26	....	7
Persons passing over railways at level crossings	63	36	51	44
Trespassers (including suicides)	459	133	479	118
Persons on business at stations, etc., and other persons not coming in above classifications	48	724	59	747
Grand total all classes, 1909	1,033	28,383	1,128	28,485
" " " " 1908	1,128	28,485	....	....
" " " " 1907	1,211	25,975	....	....
" " " " 1906	1,252	20,444	....	....
" " " " 1905	1,180	18,236	....	....
" " " " 1904	1,158	18,802	....	....
" " " " 1903	1,262	18,557	....	....
" " " " 1902	1,171	17,814	....	....
" " " " 1901	1,277	18,375	....	....
" " " " 1900	1,325	19,572	....	....
Total, ten years	11,987	214,643	....	....

†Of contractor's servants 5 were killed and 28 injured.

The startling increase noticeable in the number of injured since 1905 is wholly due to "a change in the definition of a reportable accident" and not from any greater hazard in the working of British railways. In this connection it confirms the opinion of the writer that "reportable accidents" should be confined to those causing the loss of a limb or resulting in permanent injury.

FATALITIES IN RAILWAY ACCIDENTS SINCE 1888.

In order to preserve the continuity of the statistics of railway accidents, the next summary gives the fatalities connected with the transportation industry since the Commission began compiling the data. It is confined to fatalities for the reason once given by the Commission that "injury" is an "elastic" term. It also enables a comparison with the total fatalities on British roads for ten years, on the basis that it takes fully ten years of British railway operation to equal one of American:

PASSENGERS, EMPLOYES AND OTHER PERSONS KILLED IN RAILWAY ACCIDENTS FROM 1888 TO 1908.

Year	Passengers	Employes	Other Persons		Total
			Tres-passers	Not Tres-passing	
1910	421	3,383	No data	No data	3,804*
1909	335	2,456	5,124	854	8,769
1908	406	3,358	5,560	940	10,264
1907	647	4,353	5,612	1,044	11,656
1906	418	3,807	5,381	949	10,618
1905	537	3,261	4,865	940	9,703
1904	441	3,367	5,105	868	10,046
1903	355	3,233	5,000	879	9,840
1902	345	2,516	4,403	871	8,588
1901	282	2,675	4,601	897	8,455
1900	249	2,550	4,346	660	7,865
1899	239	2,210	4,040	634	7,123
1898	221	1,958	4,063	617	6,859
1897	222	1,693	3,919	603	6,437
1896	181	1,861	3,811	595	6,448
1895	170	1,811	3,631	524	6,136
1894	324	1,823	3,720	580	6,447
1893	299	2,627	3,673	647	7,346
1892	376	2,554	3,603	614	7,147
1891	293	2,660	3,465	611	7,029
1890	286	2,451	3,062	536	6,335
1889	310	1,972	Not Given	†3,541	5,823
1888	315	2,070		†2,897	5,282

*Exclusive of trespassers and others in 1910.

†Includes trespassers.

These figures do not always coincide with those founded on the quarterly accident bulletins.

It needs but a glance at this table to see how the record of railway accidents rises and falls with traffic. The periods of depression in business are invariably marked by a decrease in the accidents to passengers, although the passenger traffic itself shows little or no decrease.

RELATION OF ACCIDENTS TO PASSENGER TRAFFIC.

This brings the reader to a consideration of the relation of railway accidents to passenger travel, which is set forth below in a summary of passengers carried one mile relatively to one killed in a train accident:

PASSENGERS CARRIED ONE MILE TO ONE KILLED.

Year	Passengers Killed in Train Accidents	Passengers Carried One Mile	Passengers Carried One Mile to One Killed
1910	217(a)	33,270,938,000	185,871,162
1909	131(b)	29,452,000,000	288,745,100
1908	165(c)	29,082,836,944	196,505,648
1907	410	27,718,554,030	72,802,600
1906	182	25,167,240,831	183,702,488
1905	350	23,800,149,436	68,000,427
1904	270	21,923,213,536	81,197,087
1903	164	20,915,763,881	127,535,745
1902	170	19,689,937,620	115,823,162
1901	110	17,353,588,444	157,759,894
1900	93	16,038,076,200	172,463,183
1899	83	14,591,327,613	175,799,127
1898	74	13,379,930,004	180,809,864
1897	96	12,256,939,647	127,676,454
1896	41	13,049,007,233	318,268,469
1895	30	12,188,446,271	406,281,542
1894	162	14,289,445,893	88,206,456
1893	100	14,229,101,084	142,291,010
1892	195	13,362,898,299	68,522,555
1891	110	12,844,243,881	116,765,853
1890	113	11,847,785,617	104,847,660
1889	161	11,553,820,445	71,762,859

(a) Of these only 179 were passengers in the proper sense of the term.
(b) Of these only 102 were passengers in the proper sense of the term.
(c) Of these only 148 were passengers in the proper sense of the term.

A glance down the last column shows that relatively to number of passengers carried one mile, 1910 had the least fatalities in a year of business activity and was only surpassed in this respect in the depressed periods of 1908 and 1909, and 1895 and 1896. It will be recalled that the greater part of the World's Fair Traffic of 1893 fell in the fiscal year 1894.

The reason for the note in regard to persons included in the term "passenger" in 1908, 1909 and 1910, is that for those years the figures cover persons traveling on freight trains, and postal clerks and express messengers, employes on Pullman cars, newsboys, live stock tenders and men in charge of freight, none of whom is included in passenger mileage and the majority of whom could properly be classed as employes.

HAZARD OF TRAIN CREWS.

With the exception of 1909, the year 1910 shows the lowest fatality average to trainmen in railway service since the record has been kept, as is shown in the following table:

SUMMARY SHOWING NUMBER OF TRAINMEN KILLED IN RAILWAY ACCIDENTS, 1889 TO 1910, WITH RATIO TO NUMBER EMPLOYED.

	Trainmen	Trainmen in Yards	Yard Trainmen Switching Crews	All Trainmen	Number of Trainmen for One Killed
1889	1,179	....	....	1,179	117
1890	1,459	....	....	1,459	105
1891	1,533	....	....	1,533	104
1892	1,503	....	....	1,503	113
1893	1,567	....	....	1,567	115
1894	1,029	....	....	1,029	156
1895	1,017	....	....	1,017	155
1896	1,073	....	....	1,073	152
1897	976	....	....	976	165
1898	1,141	....	....	1,141	150
1899	1,155	....	....	1,155	155
1900	1,396	....	....	1,396	137
1901	1,537	....	....	1,537	136
1902	1,507	....	....	1,507	135
1903	2,021	....	....	2,021	123
1904	1,181	487	488	2,156	120
1905	1,155	386	493	2,034	133
1906	1,360	400	575	2,335	124
1907	1,507	459	630	2,596	125
1908	1,097	362	496	1,955	150
1909	789	270	313	1,372	202
1910	1,056	325	474	1,855	169

The division of trainmen into three classes has only been made since 1904. Compared with the years of great transportation activity the record for 1910 shows a remarkable gain in safety. It is 35% better than 1906 or 1907, and 43% better than 1893.

THE OCCUPATIONAL HEALTH OF RAILWAY EMPLOYES.

In this connection it is at once interesting and surprising to learn that from an occupational point of view the health of railway employes stands high, and that among them and including the mortality from accidents that of enginemen and firemen stands very high. For these facts we have to go to the report of the Registrar-General of Great Britain. These show that with 1,000 as the average mortality, out of a list of 105 occupations railway employes register as follows:

Order	Class of Employe	Relative Mortality in a Mean of 1,000
5	Railway engine drivers, stokers	610
13	Plate layer, railway laborer	740
22	Railway officials or clerks	776
26	Railway guards, signalmen, pointsmen, level crossing men, railway porters and servants	813

In the list of 105 occupations only clergymen, gardeners, gamekeepers, farmers and farmers' sons are found to have a lower mortality than railway engine drivers and stokers, who stand the strain of life better than farm laborers, who occupy sixth place.

The occupation of a plate layer and railway laborer is more conducive to longevity than that of the long-lived British barrister or solicitor, who stands 16th in the roll.

The occupation of the railway official or clerk, while not nearly so health giving as that of the engineman, is more so than that of the wheelwright.

And as for the railway guard (conductor), signalman, etc., he stands a better chance of reaching old age than those engaged in 79 other occupations most of them considered less hazardous than his—including artists, actors and hotel keepers.

In regard to the occupation of enginemen and firemen the text of the report is as follows:

"Railway Engine Driver, Stoker (11).—Under this heading there were enumerated at the last Census 66,782 males over 15 years of age, of whom 65,976 were occupied, the latter number showing an increase on that recorded in 1891 of 66 per cent. From the table on page XXXVI it will be seen that the death-rate of these workers at ages 12–20 years is considerably in excess, and at ages over 65 years slightly in excess, but that at all other ages it is below the standard, the defect varying from 10 per cent. at the ages 20–25 to more than 40 per cent. in the thirty-year interval between the ages of 25 and 55 years Table IV. indicates that in the main working period the comparative mortality figure of railway engine drivers is 610, or 39 per cent. below the standard. Their mortality from accident is excessive, being 15 per cent above the average, but from every other cause of death except diabetes mellitus, they suffer considerably less than the average mortality, the defect being most marked in the case of phthisis, alcoholism and liver disease, respiratory diseases, and suicide, which are below the standard by 65, 49, 53 and 68 per cent, respectively.

Table II, shows that, as regards the occupied only, there has been since 1890–92, a decline in the mortality at every age group, the decrease being most marked at ages over 45 years. From Table IV, it will be seen that the comparative mortality figure fell from 934 to 582, or by no less than 38 per cent.

Reference to the second chart following page XXVIII shows that in 1900–02 there were only two other occupations that experienced a greater decline of mortality than railway engine drivers; these being tallow and soap makers and plate-layers, navvies, etc. In both of these occupations, however, the mortality in 1890–92 had considerably exceeded the standard, and there is reason to believe that the figures for plate-layers and navvies may have been affected to some extent by confusion of statement as to occupation, while in the case of tallow and soap workers the number of workers is comparatively small. With the single exception of suicide, which was somewhat more frequent among railway engine drivers in the recent than in the preceding period, there was in 1900–92 a substantial decline in mortalities from every other cause, cancer included. The mortality from influenza, nervous diseases and respiratory diseases declined by half, while that from circulatory and digestive disease also showed a marked decline."

Naturally enginemen have a very low mortality from alcoholism and diseases of the liver.

FIRST ACCIDENT BULLETIN UNDER NEW LAW.

Quarterly Accident Bulletin No. 37 for the months of July, August and September, the first to be issued under the revised accident law, includes casualties to other persons, trespassers, etc., and industrial accidents. The principal items given in this bulletin are as follows:

SUMMARY OF ACCIDENTS DURING MONTHS OF JULY, AUGUST AND SEPTEMBER, 1910, NUMBER OF ACCIDENTS, 3,886.

	Killed	Injured
Passengers in train accidents	63	1,871
Passengers in accidents, all causes	135	3,822
Employes on duty in train accidents	209	1,801
Employes on duty in coupling accidents	56	722
Employes on duty, all causes	869	12,148
Total passengers and employes	1,004	15,970
Employes not on duty	79	312
Trespassers	1,512	1,707
Other persons, not trespassers	353	1,391
Total	2,948	19,380

This shows a large increase over the return for the corresponding quarter in 1909, marking the toll of casualties following in the wake of the enormous traffic of the months covered.

It will be observed that the fatalities to trespassers outnumbered those from all other causes. In this connection the Railroad Commission of Indiana is setting a worthy example of sane and consistent agitation for state and municipal co-operation in checking what is almost an American habit of trespassing on railway right of way. But no public authority has had the courage to recommend the reversal of our custom of keeping crossing gates normally open for cross track traffic. In Europe the general practice is to keep the gates closed, and only open them when no train is due to permit vehicles and persons to cross. If a train is due, but not in sight, positive permission has to be obtained before the gates are opened. The American public is not enough interested in protecting crossings to share in their elimination or permit the railways to make rates that would pay interest on the investment necessary either to guard them or abolish them.

FREIGHT TRAFFIC AND ACCIDENTS.

General reference has been made to the preponderance of the freight traffic as a factor in the accident record of American railways. This is forcibly demonstrated by the following analysis of the 91 "prominent collisions," described in the Commission's quarterly accident bulletins for the year 1910:

Kind of Train in Accident	Number of Collisions	Killed	Injured
Passenger and passenger	15	27	434
Freight and passenger	30	57	416
Freight and freight	46	45	173
Total	91	129	1,023

It will be perceived that freight trains were factors in 83.5% of the collisions and 79.1% of the fatalities as reported. Their share in the injuries to persons was less because of the small crews on freight cars. But even here the freight trains shared in responsibility for nearly 60% of the injuries to persons.

Out of 91 prominent collisions the reports show that in 19 cases they occurred in the face of block signals, misread, neglected or ignored.

The value of these quarterly reports has been impaired by the inclusion in them of casualties on electric lines. The promise to separate them under the new law has not been carried out. In Bulletin No. 37, for instance, two electric railway accidents are included under the title, "Causes of 43 Prominent Accidents," in one of which 93 persons were injured, and in the other 34 were killed and 11 injured. And it is not known how many other electric railway accidents are charged up against the steam railroad account. All attempts to get at relative and comparative figures from such statistics are rendered defective by this practice.

Causes of Train Accidents.

An examination of the causes given for the prominent collisions and derailments in the Accident Bulletins of the Commission since the passage of the Act of March 3, 1901, requiring the railway companies to make full monthly reports of all accidents, affords the following general statement:

Cause	Number of Accidents
Negligence, error or forgetfulness of some member of train crew	297
Recklessness, carelessness, overlooking or disregarding orders or taking chances	270
Disobedience	58
Incompetence or inexperience	23
Defect of equipment, tires, wheels, etc.	82
Defect of roadway	35
Malicious acts	30
Misadventure, washouts, landslides, cyclones, etc.	104
Undiscovered	45
Total	944

During the year 1910 the unusual explanation that the use of intoxicating liquor by the employe at fault was a contributory cause was made in two cases. To the credit of the great army of railway employes, inebriety almost never appears among the causes of accidents.

Of 777 accidents inquired into by the official inspectors of the British Board of Trade in 1909, nearly half (359) were found to be due to "want of caution or misconduct on the part of the injured person"; 129 were due to "want of caution or breach of rules, etc., on the part of servants other than the persons injured"; 155 were ascribed to "misadventure or accidental," and the remaining 134 were divided among defective system of working, defective apparatus, etc., or want of sufficient safeguards and non-observance of rules. Of the accidents not inquired into, 3,994 out of 4,107, or 97%, were classed under the first three causes named.

Out of the whole 4,884 accidents to employes considered, the inspectors found that "It is difficult to assign more than 247 of these cases to preventable causes."

OVERWORK SELDOM A CAUSE OF ACCIDENTS.

A further analysis of the reports to the British Board of Trade shows that in 1909 only 1.12% occurred to men working in excess of 12 hours, and that in 1910, out of 847 accidents investigated, only 19, or 2.24%, happened to men who had been working in excess of 12 hours, and that in not a single instance was the accident traceable to the overwork. The following statement shows the relation of accidents to the hours the persons involved have been on duty on British railways for a period of six years:

HOURS WHEN BRITISH ACCIDENTS OCCUR.

Three Months to	Off Duty	Hours on Duty when Accidents Occurred																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Sept. 30, 1909....	3	19	19	20	22	28	18	16	16	12	18	19	7	0	2	0	1	0
Dec. 31, 1909....	1	14	28	28	13	17	23	23	20	17	15	13	8	2	1	1	0	1
Mar. 31, 1910....	6	15	28	18	17	17	16	19	11	21	16	9	6	1	0	0	1	0
June 30, 1910....	3	9	28	17	16	26	15	14	15	14	14	10	11	4	3	0	0	2
Year, 1910........	13	57	103	83	68	88	72	72	62	64	63	51	32	7	6	1	2	3
" 1909........	11	61	72	92	78	69	77	68	60	65	54	51	37	8	0	0	1	0
" 1908........	6	60	103	83	85	77	81	72	70	63	57	53	35	8	8	0	0	0
" 1907........	1	70	86	78	78	71	64	59	48	68	62	43	35	14	12	5	3	1
" 1906........	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	0	2
" 1905........	3	52	74	65	54	71	66	59	48	53	56	41	37	7	3	3	0	1
Six years.........	40	352	502	471	449	439	441	398	358	384	353	281	215	51	33	12	6	7

It is worthy of note that the greatest number of casualties happened during the 2nd hour.

RAILWAY ACCIDENTS IN EUROPE.

Excluding the returns of injured, because what constitutes a reportable injury is as variously interpreted as there are countries involved, the following table gives the number of fatalities reported on European railways according to the latest returns:

KILLED IN EUROPEAN RAILWAY ACCIDENTS.

Country	Year	Passengers	Employes	Other Persons	Total	Preceding Year
United Kingdom.......	1909	94	369	570	1,033	1,128
Germany..............	1909	121	533	726	1,380	1,353
Russia................	1907	246	746	1,867	2,859	2,751
France................	1908	* 27	300	† 298	625	659
Austria...............	1908	11	132	136	279	213
Hungary..............	1908	30	142	159	331	343
Italy..................	1908–09	26	174	93	293	262
Spain..................	1907	25	64	213	302	219
Portugal..............	1904	....	....	....	55	37
Sweden................	1908	10	31	50	91	102
Norway................	1908–09	1	4	7	12	11
Belgium...............	1908	47	51	78	176	146
Denmark..............	1907–8	1	20	9	30	22
Holland...............	1908	4	16	25	45	60
Switzerland...........	1908	15	37	38	90	95
Roumania.............	19070–8	13	22	53	88	100
Totals.............	....	671	2,641	4,322	7,689	7,501

*Train accidents only; other accidents to passengers included under "Other Persons."

†Excluding suicides.

‡Statistics cover State railways only.

It will be remarked that almost three-fifths of the fatalities on European railways are to "other persons." In France, however, every person other than an employe, except those killed in train accidents, is included under that head. Passengers are statistically "other persons," except when killed in train accidents.

It is also worthy of note that all European statistics draw the line sharply between those who are killed through no fault of their own and those who are the victims of their own negligence, carelessness or imprudence. For instance, in France, out of 625 fatalities, no less than 561 are included in official statistics under the title, "*Victimes par imprudence ou par cas fortuits.*" In Russia only 30 of the 246 fatalities to passengers was without the fault of the victim, "ohne eigenes verschulden," as the German statistician puts it, and 607 out of the 746 employes killed are classed as the victims of their own negligence or misfortune. Such a classification appears harsh to American notions, where it would relieve the railways of seven-eighths of the odium that attaches to them with the publication of the quarterly Accident Bulletins.

The European mileage represented in the last table aggregated 192,746 miles, which approximates the mileage of the United States just ten years ago, when it was 192,941, and we had a railway accident record of 249 fatalities to passengers, 2,550 to employes, 4,346 to trespassers, and 660 to other persons not trespassers, making a total of 7,865 fatalities.

It will be observed that the excess of fatalities on American railways was wholly in the class that included trespassers and suicides. Only once in the history of American railways has the number of fatalities to passengers approached that shown in the above table for Europe, and by 1907 there were nearly 35,000 more miles of line to be safeguarded against accidents and trespassers than are represented in the European table.

TWO DECADES OF RAILWAY PROGRESS

RAILWAY RESULTS IN THE UNITED STATES FOR YEARS, ENDING JUNE 30, 1890, 1900 AND 1910 WITH PERCENTAGES OF INCREASE BY DECADES.

Item (m=thousands)	1890	1900	1910	1910 over 1890 %	1910 over 1900 %
Population	62,947,714	76,085,794	91,972,266	46.2	21.0
Miles of line (operated)	156,404	192,556	239,652	53.2	24.4
Miles of all track	199,875	258,784	349,159	74.7	34.9
Net capitalization (m)	$7,577,327	$9,547,984	$13,872,380	85.1	45.3
Net capitalization per mile of line	49,473	51,094	58,316	17.9	14.1
Net capitalization per mile of track	38,541	37,724	40,860	6.0	8.3
Gross earnings from operation (m)	1,051,877	1,487,044	2,787,266	164.9	87.4
Gross earnings per mile of line	6,725	7,722	11,633	72.9	50.6
Expenses of operation (m)	692,093	961,428	1,847,189	165.4	92.1
Expenses of operation per mile of line	4,425	4,993	7,710	74.2	54.4
Net earnings from operation	359,783	525,616	940,076	161.3	78.8
Net earnings from operation per mile	2,300	2,729	3,923	70.6	43.7
Ratio of expenses to earnings	65.80 %	64.65 %	66.27 %	.7	2.2
Receipts from passengers (m)	260,786	323,715	631,772	142.2	95.1
Receipts from freight (m)	714,464	1,049,256	1,935,882	170.9	84.5
Receipts from mail (m)	23,367	37,752	49,323	111.1	30.6
Receipts from express (m)	20,277	28,416	69,253	241.5	143.7
Passengers carried (m)	492,430	576,865	952,325	93.4	65.0
Passengers carried one mile (m)	11,847,785	16,039,007	33,949,936	186.5	111.6
Receipts per passenger per mile (cents)	2,167	2.003	1.871	d13.6	d6.5
Freight tons carried (m)	636,541	1,101,680	1,760,103	176.5	59.7
Freight tons carried one mile (m)	76,207,047	141,599,159	255,528,643	235.5	80.4
Receipts per ton per mile (mills)	9.41	7.29	7.58	d19.4	3.9
Locomotives, number	30,140	37,663	59,133	96.1	57.5
Locomotives, weight without tenders (tons)	1,265,880	2,023,702	4,271,000	237.2	111.0
Passenger cars, number	26,820	34,713	46,890	74.8	35.0
Average passengers to car	41	41	58	41.4	41.4
Freight cars, number	918,491	1,365,531	2,134,000	132.3	56.2
Freight cars, capacity (tons)	19,288,301	37,210,720	74,043,000	283.8	98.9
Average tons in train	175	271	382	118.3	40.9
Employes, number	749,301	1,017,653	1,754,400	134.1	72.4
Employes per 100 miles of line	479	529	733	53.0	38.5
Employes' compensation	$418,716,265	$577,264,841	$1,172,181,000	179.9	103.0
Proportion of gross earnings	39.80	38.82	42.00 %	5.5	8.2
Proportion of operating expenses	60.50	60.04	63.41 %	4.8	5.6
Taxes	31,207,469	48,332,273	104,144,076	233.7	111.3
Per mile of line	199	254	435	118.5	71.2
Proportion of gross earnings	2.97	3.25	3.73 %	25.6	14.7

XIII

RAILWAY RECEIVERSHIPS IN 1910

The affairs of seven railway companies operating 735 miles were placed in the hands of receivers during the calendar year 1910, as compared with five, operating 859 miles, in 1909 and 24 operating 8,009 miles in 1908. The receiverships of 1910 involved a capitalization of only $51,427,500 as compared with $78,095,000 the preceding year and $596,359,000 in 1908. On the other hand, seventeen roads with a mileage of 1,100 and $93,660,100 capital emerged from receiverships through foreclosure sales.

In the statement below are given the names, mileage, funded debt and capital stock of the roads for which receivers were appointed in 1910:

Railway	Mileage	Funded Debt	Stock
Bartlett-Florence..........................	11	$ 78,000	$ 25,000
*Buffalo & Susquehanna Railway............	361	17,568,000	14,000,000
Delaware & Eastern.........................	46	1,234,500	720,000
Fort Dodge, Des Moines & So................	167	5,702,000	6,700,000
New Mexico Central.........................	116	2,500,000	2,500,000
San Antonio & Rio Grande...................	10	.. ..	....
Albia & Centerville........................	24	....	400,000
	735	$27,082,500	$24,345,000

The number, mileage and capitalization of the railways that have failed since 1876, as given in the *"Railway Age Gazette,"* are as follows:

RECEIVERSHIPS SINCE 1876.

	Roads	Miles	Bonds and Stock (Thousands)		Roads	Miles	Bonds and Stock (Thousands)
1876........	42	6,662	$467,000	1893.......	74	29,340	$1,781,046
1877........	38	3,637	220,294	1894.......	38	7,025	395,791
1878........	27	2,320	92,385	1895.......	31	4,089	369,075
1879........	12	1,102	39,367	1896.......	34	5,441	275,597
1880........	13	885	140,265	1897.......	18	1,537	92,909
1881........	5	110	3,742	1898.......	18	2,069	138,701
1882........	12	912	39,074	1899.......	10	1,019	52,285
1883........	11	1,990	108,470	1900.......	16	1,165	78,234
1884........	37	11,038	714,755	1901.......	4	73	1,627
1885........	44	8,836	385,460	1902.......	5	278	5,835
1886........	13	1,799	70,346	1903.......	9	229	18,823
1887........	9	1,046	90,318	1904.......	8	744	36,069
1888........	22	3,270	186,814	1905.......	10	3,593	176,321
1889........	22	3,803	99,664	1906.......	6	204	55,042
1890........	26	2,963	105,007	1907.......	7	317	13,585
1891........	26	2,159	84,479	1908.......	24	8,009	596,359
1892........	36	10,508	357,692	1909.......	5	859	78,095
				1910.......	7	735	51,427
Total, 35 years....................................					719	129,233	$7,421,953

XIV STATISTICS OF

The mileage and traffic statistics of the principal countries of the world are set forth in the following statement. So far as possible the information has been obtained from official sources or authoritative publications, and where estimates have been resorted to they have been computed from ascertained facts. The average journey and haul given for British traffic is that furnished by the London *Statist*.

Country	Year	Miles Covered by Capitalization	Capitalization or Cost of Construction	Passenger Revenues	Freight Revenues	Other Revenues
United Kingdom...	1909	23,280	$6,401,160,346	$204,296,797	$289,653,988	$91,146,920
German Empire....	1909	36,235	4,048,810,560	190,350,960	425,517,120	66,433,200
France............	1908	24,915	3,535,954,000	149,648,147	179,700,564	5,367,222
Russian Empire....	1907	41,586	3,290,952,485	64,502,720	305,710,180	56,668,025
Austria............	1908	13,591	1,564,787,400	41,680,000	124,820,000	9,100,000
Hungary..........	1908	12,177	790,430,500	20,912,200	55,822,400	4,123,200
Italy*.............	1908–09	8,719	1,131,300,000	33,183,262	52,543,780	8,077,379
Spain..............	1905	8,432	649,919,610	16,215,866	34,694,555	6,190,271
Portugal...........	1905	1,425	162,385,280	4,014,196	5,322,875	423,936
Sweden............	1906	7,938	267,408,450	10,665.270	21,051,360	815,670
Norway...........	1908–09	1,764	71,436,740	2,779,696	3,734,044	391,816
Denmark*..........	1908–09	1,215	63,625,230	5,254,200	5,491,260	740,880
Belgium*...........	1908	2.663	480,687,923	16,855,269	33,503 642	1,550,562
Holland...........	1908	2,235	191,821,000	11,246,000	11,526,800	916,000
Switzerland........	1908	2,791	319,460,741	16,805,861	20,443,718	1,718,086
Roumania..........	1908–09	1,976	182,970,024	4,821,333	9,413,961	599,072
Canada............	1910	24,731	1,601,050,750	46,018,880	116,229,894	11,707,443
Argentina..........	1907	13,690	820,433,280	19,853,760	56,597,760	7,578,240
Japan*.............	1908	3,982	190,173,728	18,786,895	14,651,808	1,448,881
British India.......	1908	30,809	1,336,005,760	55,132,160	84,225.280	4,088,640
New South Wales...	1910	3,643	238,264,750	8,882,880	16,022,300	1,806,770
	....	267,797	$27,339,038,557	$941,906,352	$1,866,677,289	$279,976,213
United States......	1910	239,052	13,872,380,171	631,772.131	1,935,882,873	219,611,131

* State only.

From the data here furnished it is possible to make a close approximation of the average passenger and freight receipts per ton mile in the countries named.

FOREIGN RAILWAYS

The average passenger journey and freight haul in the United States are more than twice as long as the average for the rest of the world.

In this table taxes have been added to the operating expenses of the railways of the United States. For further details of the railways of Canada, the United Kingdom and the German Empire, for which more complete statistics are available, the reader is referred to succeeding pages.

Total Earnings	Operating Expenses	Per Cent Expenses to Revenues	Passengers Carried	Average Journey (Miles)	Freight Tons Carried	Average Haul (Miles)	Per Cent Net Revenues to Capital
$585,097,705	$365,430,190	62.4	1,717,850,260	7.8	499,906,000	25.0	3.43
682,301,280	481,728,720	70.6	1,469,639,916	14.2	491,024.070	61.3	5.09
334,715,933	190,388,324	57.9	479,396,165	20.7	158,165,909	80.7	4.08
426,880,925	348,994,385	81.9	149,135,000	80.4	224,154,000	165.4	....
175,620,000	133,920,000	76.2	228,264,709	18.8	155,101,551	58.8	2.70
80,857,800	59,481,400	73.5	111,714,000	20.8	61,862,000	70.8	....
93,804,421	89,668,958	95.6	68,356,980	24.0‡	31,525,800	66.0‡	....
57,100,692	27,750,936	48.6	41,846,249	26.0‡	22,662,548	69.4	4.5
9.761,007	4,426,236	45.3	13,446,043	20.0‡	3,775,559	54.0‡	3.3
32,572,300	21,624,840	66.3	46,452,445	16.8	31,961,244	43.4	4.24
6,955,556	5,105,132	73.9	14,691,114	15.7	5,868,267	36.1	2.11
11,486,340	10,689,840	93.0	21,302,909	21.7	4,800,604	53.3	1.29
51,909,473	35,274,996	67.9	158,466,929	14.7	51,789,106	43.5	3.29
23,688.800	19,037,392	83.6	43,350.000	17.8	16,245,900	55.8	1.94
38,967,665	27,811,686	71.4	102,549,663	12.3	16.835,455	42.4	3.49
14,834,366	9,769,081	65.9	8,319,958	43.4	6,796,315	55.9	2.78
173,956,217	120,405,440	69.2	35,894,575	69.0	74,482,866	211.0	3.34
83,029,760	56,198,080	67.7	41,911,512	25.2	27,933,828	115.9	3.95
34,887,584	17,875,971	51.2	101,115,739	23.3	18.312,223	78.8	8.9
143,446 030	86,408,000	60.2	321,169,000	37.7	62,398,000	159.1	4.33
26,711,950	15,954,120	59.7	53,654,271	11.4	8,393,038	84.7	4.52
$3,087,619,854	$2,127,943,727	....	5,228,427,437	17.20	1,973,994,283	68.5	....
2,787,266,136	† 1,951,333,849	70.0	952,325,000	35.6	1,760.103,000	146.0	6.03

‡ Estimated.

Here the writer acknowledges the courtesy of the Railway Department of Canada for an early copy of its valuable statistics of the railways of the Dominion for 1910.

RAILWAYS OF CANADA.

STATISTICS OF THE RAILWAYS OF THE DOMINION FOR THE YEARS ENDING JUNE 30, 1908, 1909 AND 1910.

	1908	1909	1910
Miles of line operated	22,966	24,104	24,731
Second track	1,211	1,464	1,543
Yard track and sidings	4,546	4,761	5,155
All tracks	28,723	30,329	31,429
Capital cost:*			
Stock	$607,425,349	$647,534,647	$687,557,387
Funded debt	631,869,664	660,946,769	722,740,300
Government railways	109,423,104	111,545,903	118,018,751
Subsidies	166,291,482	188,963,337	190,753,063
Total capital cost	$1,515,009,599	$1,608,990,656	$1,719,069,501
Per mile of line	65,968	66,752	69,513
Passenger traffic:			
Passengers carried	34,044,992	32,683,309	35,894,575
Passengers carried 1 mile	2,081,960,864	2,033,001,225	2,466,729,664
Average journey (miles)	61	62	69
Average passengers per train	54	51	59
Mileage of passenger trains	31,950,349	32,295,730	35,022,541
Mileage of mixed trains	6,210,807	7,061,580	6,441,440
Receipts from passengers	$39,992,503	$39,073,488	$46,018,880
Receipts per passenger mile (cents)	1.920	1.921	1.866
Freight traffic:			
Tons carried	63,019,900	66,842,258	74,482,866
Tons carried 1 mile	12,961,512,519	12,961,512,519	15,712,127,701
Average haul (miles)	206	197	211
Freight train mileage	40,476,370	40,304,906	50,184,108
Average tons per train	278	278	311
Receipts from freight	$93,746,655	$95,714,783	$116,229,894
Receipts per ton mile (mills)	7.23	7.27	7.39
Miscellaneous receipts	$13,179,155	$10,268,065	$11,707,443
Total receipts	146,918,313	145,056,336	173,956,217
Expenses of operation:			
Way and structures	$20,778,610	$21,153,274	$27,035,603
Maintenance of equipment	20,273,626	21,510,303	26,002,301
Traffic expenses	....	3,798,824	4,366,177
Conducting transportation	62,486,270	54,284,587	58,928,171
General expenses	3,765,636	3,853,094	4,073,188
Total expenses	$107,304,142	$104,600,082	$120,405,440
Ratio to earnings	73.04%	72.11%	69.2%
Net receipts	$39,614,171	$40,456,251	$53,550,776
Percentage to capital cost	2.61%	2.51%	3.12%
Gross receipts per mile	$6,398	$6,018	$7,033
Gross expenses per mile	4,672	4,339	4,868
Number of employes	106,404	125,195	123,768
Compensation	$60,376,607	$63,216,662	$67,167,793
Proportion of gross earnings	41.10%	43.58%	38.82%
Proportion of operating expenses	56.27%	60.43%	55.78%
Average per employe per year	$569	$505	$503

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*The net capital liability of the Canadian railways, exclusive of Government owned roads, in 1910 was $1,183,998,699 or $52,361, which is far below their "capital cost."

RAILWAYS OF THE UNITED KINGDOM.

STATISTICS OF MILEAGE, CAPITALIZATION, AND TRAFFIC FOR THE YEARS 1907, 1908 AND 1909.

	1907	1908	1909
Length of railways:			
Double track or more (miles)	12,845	12,926	12,996
Single track	10,263	10,279	10,284
Total length of line	23,108	23,205	23,280
All tracks, sidings, etc.	53,158	53,669	53,972
Total capitalization (paid up)	$6,302,099,773	$6,382,296,742	$6,401,160,346
Capitalization per mile of line	272,723	275,040	274,964
Passenger traffic:			
Passengers carried	1,259,481,000	1,278,115,000	1,265,081,000
Season ticket journeys	445,101,956	447,516,620	452,769,260
Passengers carried one mile	13,295,747,058	13,459,926,636	13,399,232,028
Average journey (miles)	7.8	7.8	7.8
Receipts from passengers	$205,036,740	$207,539,004	$204,296,797
Receipts per passenger mile (cents)	1.54	1.542	1.525
Mail and other receipts	$43,213,632	$44,067,043	$45,071,850
Freight traffic:			
Minerals, tons carried	407,602,177	388,424,541	395,300,000
General merchandise	108,284,939	103,170,515	104,605,000
Total freight, tons	515,887,116	491,595,056	499,905,000
Tons carried one mile	12,897,177,900	12,289,876,400	12,497,625,000
Average haul (miles)	25	25	25
Receipts from freight	$298,058,610	$286,786,249	$289,653,988
Receipts per ton mile (cents)	2.31	2.333	2.32
Miscellaneous receipts	$45,634,648	$45,493,075	$46,075,070
Total receipts	$591,943,630	$583,885,371	$585,097,705
Expenses of operation	373,085,840	372,103,990	365,430,190
Ratio of expenses to earnings	63.0	63.75	62.4
Net receipts	$218,857,790	$211,776,820	$219,812,320
Percentage to paid-up capital	3.47	3.32	3.43
Gross receipts per mile	$25,616	$25,162	$25,133
Gross expenses per mile	16,165	16,035	15,699
Number of employes	621,341	*621,341	*621,341
Total compensation	$158,116,560	$156,348,915	$156,225,173
Proportion of gross earnings	26.7	26.78	26.7
Proportion of operating expenses	42.4	42.02	42.75
Average per employe per year	$254.47	$251.78	$251.45

*No enumeration of employes has been made since 1907; the last preceding, in 1904, gave a total of 581,664.

Railways of Germany.

Statistics of Mileage, Cost of Construction, and Traffic for the Years 1906, 1908 and 1909.

	1906	1908	1909
Length of State railways (miles)	32,050	32,922	34,058
Length of private railways	2,513	2,636	2,167
Total	34,563	35,558	36,235
Cost of construction	$3,613,493,706	$3,903,848,400	$4,048,810,560
Cost per mile	104,548	109,788	111,737
Passenger traffic:			
Passengers carried	1,209,224,072	1,361,655,150	1,469,639,916
Passengers carried (one mile)	17,189,336,940	19,202,935,120	20,862,117,120
Average journey (miles)	14.21	14.10	14.17
Receipts from passengers	$170,165,002	$178,100,400	$190,350,960
Receipts per passenger per mile (cts.)	0.99	0.93	.913
Freight traffic:			
Fast freight and express:			
Tons carried	3,791,769	4,013,970	4,195,098
Tons carried one mile	265,115,720	269,726,040	273,234,000
Average haul (miles)	69.91	66.96	65.1
Receipts from same	$16,924,080	$17,015,040	$17,471,520
Receipts per ton mile (cents)	6.38	6.32	6.36
All freight:			
Tons carried	455,144,382	461,296,759	491,024,070
Tons carried one mile	28,118,620,680	29,420,680,340	30,917,232,220
Average haul (miles)	61.78	61.60	61.3
Receipts from freight	$397,580,738	$412,635,760	$425,517,120
Receipts per ton mile (cents)	1.41	1.42	1.41
Miscellaneous receipts	$63,151,060	$56,715,200	$66,433,200
Total receipts	$630,796,800	$647,451,503	$682,301,280
Expenses of operation	407,174,400	476,290,080	481,728,720
Ratio expenses to earnings	64.5	73.6	70.6
Net receipts	$223,622,400	$171,261,040	$200,572,560
Percentage on cost of construction	6.18	4.51	5.09
Gross receipts per mile	$18,251	$18,173	$18,830
Gross expenses per mile	11,780	13,489	13,018
Number of employes	648,437	699,155	691,087
Total compensation	$219,390,932	$259,606,560	$264,047,660
Proportion of gross earnings	34.78	40.10	38.7
Proportion of operating expenses	53.88	54.50	54.8
Average per employe per year	$338.35	$371.00	$382.10

Apparently the government has attempted to offset recent advances in the pay of German railway employes by reducing their numbers. It could afford to do so, as they still number 19 per mile of line to 9.4 in the United States.

XV
GROWTH OF RAILWAYS

In three-quarters of a century American railways from small beginnings in Pennsylvania in 1827, Maryland in 1828, South Carolina in 1830, and New York and Massachusetts in 1831, show the following remarkable growth by decades:

PROGRESS OF RAILWAYS IN THE UNITED STATES SINCE 1835.

States	1835	1840	1850	1860	1870	1880	1890	1900	1909*
Alabama	46	46	75	743	1,429	1,851	3,148	4,219	4,976
Arkansas				38	256	896	2,113	3,341	5,134
California				23	925	2,220	4,148	5,744	7,379
Colorado					157	1,531	4,154	4,587	5,409
Connecticut		102	402	601	742	954	1,007	1,023	1,004
Delaware	16	39	39	127	224	280	328	346	336
Florida			21	402	446	530	2,390	3,272	4,173
Georgia		185	643	1,420	1,845	2,535	4,105	5,639	6,890
Idaho						220	941	1,261	2,117
Illinois			111	2,799	4,823	7,955	9,843	10,997	11,834
Indiana			228	2,163	3,177	5,454	5,891	6,469	7,382
Iowa				655	2,683	5,235	8,347	9,180	9,747
Kansas					1,501	3,439	8,806	8,719	8,947
Kentucky	15	28	78	534	1,017	1,598	2,694	3,059	3,420
Louisiana	40	40	80	335	479	633	1,658	2,824	5,315
Maine		11	245	472	786	1,013	1,313	1,915	2,105
Maryland and D. C.	117	213	259	386	671	1,012	1,168	1,407	1,409
Massachusetts	113	301	1,035	1,264	1,480	1,893	2,094	2,118	2,101
Michigan		50	342	779	1,638	3,931	6,789	8,193	9,051
Minnesota					1,072	3,108	5,466	6,942	8,530
Mississippi			75	862	990	1,183	2,292	2,919	4,349
Missouri				817	2,000	4,011	5,897	6,867	8,031
Montana						48	2,181	3,010	4,099
Nebraska					1,812	2,000	5,274	5,684	6,015
Nevada					593	769	925	909	2,121
New Hampshire		53	467	661	736	1,015	1,133	1,239	1,248
New Jersey	99	186	206	560	1,125	1,701	2,034	2,237	2,250
New York	104	374	1,361	2,682	3,928	6,019	7,462	8,121	8,420
North Carolina		53	154	937	1,178	1,499	2,904	3,808	4,761
North Dakota					35	635	1,940	2,731	4,200
Ohio		30	575	2,946	3,538	5,912	7,719	8,774	8,960
Oklahoma						275	1,213	2,150	5,769
Oregon					159	582	1,269	1,723	2,149
Pennsylvania	318	754	1,240	2,598	4,656	6,243	8,307	10,277	11,140
Rhode Island		50	68	108	136	210	212	212	212
South Carolina	137	137	289	973	1,139	1,429	2,096	2,795	3,275
South Dakota					30	630	2,485	2,850	3,947
Tennessee				1,253	1,492	1,824	2,710	3,124	3,678
Texas				307	711	3,293	7,911	9,873	13,458
Utah					257	770	1,090	1,547	1,957
Vermont			290	554	614	912	913	1,012	1,067
Virginia	93	147	384	1,379	1,486	1,826	3,142	3,729	4,411
Washington						274	1,699	2,890	4,633
West Virginia					387	694	1,306	2,198	3,390
Wisconsin			20	905	1,525	3,130	5,468	6,496	7,274
Wyoming						472	941	1,228	1,573
Arizona						384	1,061	1,511	1,994
New Mexico						643	1,284	1,752	3,003
Dist. Columbia									35
Total	1,098	2,818	9,021	30,635	52,922	93,671	159,271	192,940	234,799

*Exclusive of switching and terminal companies—1,623 miles.

GROWTH OF RAILWAYS OF THE WORLD.

In the following table is given the mileage of the principal countries in the world from the earliest date available to the latest:

Country	Miles of Road Completed								
	Opened	1840	1850	1860	1870	1880	1889	1899	1909†
Great Britain	1825	1,857	6,621	10,433	15,537	17,933	19,943	21,666	23,280
United States	1827	2,818	9,021	30,626	52,922	93,296	160,544	....	236,422
Canada	1836	16	66	2,065	2,617	7,194	12,585	17,250	24,731
France	1828	......	1,714	5,700	11,142	16,275	21,899	26,229	29,364
Germany	1835	341	3,637	6,979	11,729	20,693	24,845	31,386	36,235
Belgium	1835	207	554	1,074	1,799	2,399	2,776	2,833	2,888
Austria (proper)	1837	......	817	1,813	3,790	7,083	9,345	11,921	13,591
Russia in Europe	1838	......	310	988	7,098	14,026	17,534	26,889	35,347
Italy	1839	13	265	1,117	3,825	5,340	7,830	9,770	10,425
Holland	1839	10	110	208	874	1,143	1,632	1,966	2,235
Switzerland	1844	......	15	653	885	1,596	1,869	2,342	2,791
Hungary	1846	......	137	1,004	2,157	4,421	6.751	10,619	12,177
Denmark	1847	......	20	69	470	975	1,217	1,764	2,121
Spain	1848	......	17	1,190	3,400	4,550	5,951	8,252	8,961
Chili	1851	......	......	120	452	1,100	1,801	2,791	3,451
Brazil	1851	......	......	134	504	2,174	5,546	9,195	11,863
Norway	1854	......	......	42	692	970	970	1,231	1,608
Sweden	1856	......	......	375	1,089	3,654	4,899	6,663	8,321
Argentine Republic	1857	......	......	....	637	1,536	4,506	10,013	14,111
Turkey in Europe	......	......	......	41	392	727	1,024	1,900	1,967
Peru	......	......	......	47	247	1,179	993	1,035	1,470
Portugal	......	......	......	42	444	710	1,188	1,475	1,689
Greece	1869	......	......	....	6	7	416	604	845
Uruguay	1869	......	......	....	61	268	399	997	1,371
Mexico	1868	......	......	....	215	655	5,012	8,503	14,845
Roumania	......	......	......	....	152	859	1,537	1,920	1,976
Australia*	......	......	......	....	....	789	4,850	11,111	17,956
Japan	1874	......	......	....	....	75	542	3,632	5,159
British India	1853	......	......	838	4,771	9,162	15,887	23,523	30,809
China	1883	......	......	....	....	....	124	401	4,997
Africa	......	......	......	....	....	583	2,873	5,353	19,207

*Including New Zealand.

†Or latest figures.

RECOMMENDATIONS

In the interest of sane and just regulation of American railways it is respectfully suggested:

That the Bureau of Railway Statistics and Accounts, now a division of the Interstate Commerce Commission, be transferred to the Department of Commerce and Labor;

That its statistics be confined to the affairs of operating companies, as the only railway carriers engaged in interstate commerce;

That its inquiries be confined to data necessary to furnish the public with comprehensive and truthful information of railway conditions and operations in the United States from year to year;

That the practice of including dividends declared from INVESTMENT INCOME with dividends from TRANSPORTATION INCOME be discontinued;

That a genuine expert investigation into the causes of railway accidents, modeled after the British practice, be authorized and established by federal statute.

Respectfully submitted,
SLASON THOMPSON.

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